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Arthur D'Little

Performance of Sampling Activities at MTL, Watertown, Massachusetts for EG&G Idaho, Inc.

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May, 1990

Prepared for

U.S. Army Toxic and Hazardous Materials Agency CETHA-BC/Bldg. E4435 Aberdeen Proving Ground, Maryland 20101-5401

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Table of Contents

1.0	Introduction
2.0	Site Location and History
3.0	Regional Geology63.1 Bedrock Geology63.2 Structural Geology63.3 Quaternary Geology8
4.0	Site Geology 10 4.1 Site Location 10 4.2 Bedrock Geology 10 4.3 Quaternary Geology 15 4.4 Hydrology 18
5.0	Sampling Activities265.1 Ground Water Samples265.2 Soil Samples395.3 Storm Sewer Sediment Samples405.4 Outfall 24-Hour Composite Samples415.5 Tank and Sump Samples425.6 Water Sample from the Reactor Emergency Coolant Tank42
Ref	erences

List of Tables

		Page
Table 3.1	General Properties of Basal Till and Outwash Deposits in the Boston Area (After Hatheway, 1982)	9
Table 4.1	Hydraulic Parameters	20
Table 4.2	Groundwater Surface Elevations	21
Table 4.3	Calculated in Situ Hydraulic Conductivity Measurements	24
Table 5.1	Proposed Samples and Analytes	27
Table 5.3	Sample Container, Preservation and Holding Time	37
Table 5.4	Water Sample Preservation	38

List of Figures

		Page
Figure 2.1	Location of Army Materials Technology Laboratory, Watertown, Massachusetts	4
Figure 3.1	General Geology of the Boston Basin (after billings, 1976)	7
Figure 4.1	Topographic Map of the AMTL, Watertown, Massachusetts	11
Figure 4.2	Location of Drill Holes and Geologic Cross Sections	12
Figure 4.3	Geologic Cross Section M10 - M07	13
Figure 4.4	Geologic Cross Section M01 - C03	14
Figure 4.5	Location of Seismic Refraction Profiles	16
Figure 4.6	Seismic Refraction Profiles	17
Figure 4.7	Ground Water Level Contour Map	22
Figure 4.8	Ground Water Level Contour Map	23
Figure 5.1	Location of Ground Water Monitoring Wells	31
Figure 5.2	Location of Soil Samples	32
Figure 5.3	Location of Storm Sewer Samples	33
Figure 5.4	Location of Outfall Samples	34
Figure 5.5	Location of Tank and Sump Samples	35

Abstract

Arthur D. Little, Inc., was retained by EG&G Idaho, Inc., under subcontract C87-131488 issued pursuant to Contract No. DE-AC07-761D01570 to conduct geotechnical services at the Material Technology Laboratory (MTL) in Watertown, Massachusetts. The objective of this "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling is intended to duplicate, to the extent possible, the sampling performed in 1988.

The Army Materials Technology Laboratory (MTL) is located in Watertown, Massachusetts about six miles west of Boston. The facility currently occupies approximately 47 acres on the north bank of the Charles River and includes ten major structures used for research, development, testing and manufacturing.

The efforts involved in this investigation included:

- Collection of 18 groundwater samples at 16 existing monitoring wells. Two wells were sampled twice with the second sampling performed on a different day. Two field blanks were submitted with these samples. Trip blanks for volatiles were submitted with shipment of all volatile samples;
- Determination of water levels at 16 existing monitoring wells;
- Collection of 22 shallow surface soil samples taken by hand auger. This included two duplicate samples and two field blanks;
- Collection of three sediment samples from storm sewer catch basins;
- Collection of seven 24 hour composite samples from storm sewer outfalls on the Charles River;
- · Collection of eight surface water and storage tank samples; and
- Collection of a sample of water from the reactor emergency coolant tank.

Samples were collected for volatile organics, base/neutral/acid extractables (semivolatile organics), pesticide/PCB's, metals, cyanide, and sulfide. The five samples collected adjacent to transformers were analyzed for PCBs only. Analyses necessary to chemically characterize samples in accordance with U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) certified methods were not completed under this contract but are provided under the USATHAMA Class contract with Arthur D. Little. Analytical data will be provided along with modeling, assessments, evaluations and conclusions in the Remedial Investigation (RI) Report.

The duration of the program was approximately nine weeks. Field activities commenced on February 5, 1990. All of the above tasks were successfully accomplished.

1.0 Introduction

Arthur D. Little, Inc., was retained by EG&G Idaho, Inc., under subcontract C87-131488 issued pursuant to Contract No. DE-AC07-761D01570 to conduct geotechnical services at the Material Technology Laboratory (MTL) in Watertown, Massachusetts. The objective of this "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling is intended to duplicate, to the extent possible, the sampling performed in 1988.

Analyses necessary to chemically characterize samples in accordance with U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) certified methods were not completed under this contract but are provided under the USATHAMA Class contract with Arthur D. Little.

1.1 Scope of Work

The efforts involved in this investigation included:

- Collection of 18 groundwater samples at 16 existing monitoring wells. Two wells were sampled twice with the second sampling performed on a different day. Two field blanks were submitted with these samples. Trip blanks for volatiles were submitted with shipment of all volatile samples;
- Determination of water levels at 16 existing monitoring wells;
- Collection of 22 shallow surface soil samples taken by hand auger. This included two duplicate samples and two field blanks;
- · Collection of three sediment samples from storm sewer catch basins;
- Collection of seven 24 hour composite samples from storm sewer outfalls o the Charles River.
- · Collection of eight surface water and storage tank samples; and
- Collection of a sample of water from the reactor emergency coolant tank.

All samples were collected in accordance with the USATHAMA QA Program, December 1986, 2nd Edition, March 1987, and Geotechnical Requirements for Drilling, Monitor Wells, Data Acquisition and Reports, March 1987. All samples were preserved as specified in that plan. Prior to transport all samples were screened for radioactivity. All samples were transported to the Arthur D. Little analytical laboratory and full chain of custody was maintained for all samples.

Samples were collected for volatile organics, base/neutral/acid extractables (semivolatile organics), pesticides/PCB's, metals, cyanide, and sulfide. The five samples collected adjacent to transformers were analyzed for PCBs only.

Chemical analysis necessary to develop data was conducted under a separate contract (under USATHAMA Class contract with Arthur D. Little) and thus will not be discussed in this final report. The list of compounds analyzed was specified by EG&G Idaho based on the previous sampling performed in 1988. Analytical data will be provided along with modeling, assessments, evaluations, and conclusions in the Remedial Investigation (RI) Report.

A review of options for disposal of purge waters was prepared. Purge water was contained in 55 gallon drums and stored on wooden pallets. Drums are labeled by the designation RI - MW - well number.

The duration of the program was approximately nine weeks. Field activities commenced on February 5, 1990. All of the above tasks were successfully accomplished.

Prior to commencing work at MTL, Arthur D. Little prepared a Health and Safety Plan, a Quality Control Plan, and a Sampling Plan. These plans, approved by EG&G Idaho and USATHAMA, detailed our procedures for site safety, operating procedures and quality objectives for site activities, locations of all samples and sampling procedures. During the program, quality objectives and performance were audited by Arthur D. Little's Quality Control Manager and during activity on site, safety procedures were monitored by Arthur D. Little's site Health and Safety Manager.

2.0 Site Location and History

2.1 Site Location

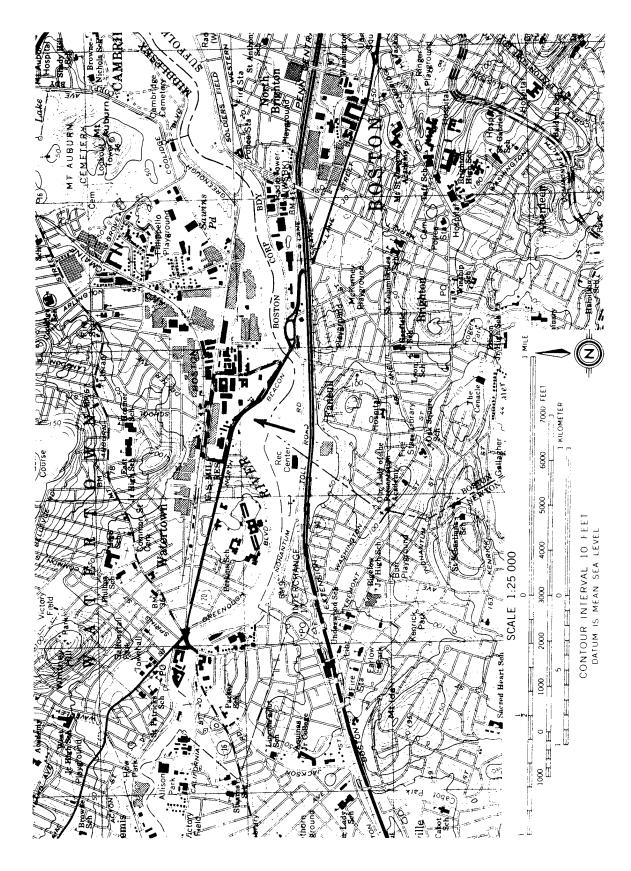
The Army Materials Technology Laboratory (MTL) is located in Watertown, Massachusetts about six miles west of Boston (see Figure 2.1). The facility currently occupies approximately 47 acres on the north bank of the Charles River and includes ten major structures used for research, development, testing and manufacturing.

2.2 Site History and Description

The MTL was originally established as the Watertown Arsenal in 1816 by order of President James Madison. The arsenal was initially used for the storage, cleaning, repair, and issue of small arms and ordinance supplies. Manufacturing was conducted on a limited scale until 1830. Activities were then expanded to include the manufacture of field, siege and seacoast guns, and gun carriages. During the Civil War, the arsenal was mobilized for the war effort and produced vast quantities of ammunition. In the 1880s the arsenal assumed responsibility for material testing and experimentation; special operations included mixing paint, preparing lubricants, waterproofing paper cartridges, and preparing ingredients for pyrotechnics such as post fires, fuzes, rock-fire, torches, fireballs, and signal rockets. In the final two decades of the 19th century, the arsenal was engaged in the manufacture of newly designed, field and siege, breech-loading steel guns and their carriages.

Activity at the arsenal increased dramatically during World War I. The facility was used for the production of ordinance supplies. More than 20 buildings were constructed during this period, and employment soared to more than 5,000. At its peak activity during World War II, the arsenal encompassed an area of approximately 131 acres, employed 10,000 people and maintained 53 buildings and structures. The number of employees dropped sharply after World War II. However, the arsenal continued to play an important role in arms development, and in 1953 it produced the famous 75-mm Skysweeper anti-aircraft gun. In 1960, the Army's first neutron radiography research nuclear reactor was dedicated at the facility. The reactor, used for researching the molecular and atomic structures of materials, was later deactivated in 1970.

A phase-down in operation was initiated in 1967. Much of the arsenal property was transferred to the General Services Administration (GSA). In 1968, approximately 55 acres of GSA property was sold to the Town of Watertown and was subsequently used for apartment buildings, the Arsenal Mall, and a public park and playground. Some 47.5 acres on the west end of the arsenal grounds was retained by the Army and later became the Army Materials and Mechanics Research Center (AMMRC), which in 1985 became MTL.



Location of Army Materials Technology Laboratory, Watertown, Massachusetts Figure 2.1

While known as the AMMRC, the facility was designated a historical landmark by the American Society of Metals. Building 111 is virtually unaltered after 120 years of occupancy. It was placed on the National Register of Historic Places on January 30, 1976. In addition, a National Register nomination was prepared for the Gun Carriage Manufacturing Complex (Building 37, 43, 312, and 313).

Today, MTL employs approximately 600 people and occupies 15 buildings. It continues to function as the Army lead laboratory for materials, materials testing technology, lightweight armor, solid mechanics, and manufacturing testing technology.

3.0 Regional Geology

The following description of regional geology is taken from the 1988 Arthur D. Little report, "Geotechnical Report, Army Materials Technology Laboratory, Watertown, Massachusetts".

3.1 Bedrock Geology

The MTL facility is located within the north central portion of the Boston Basin, a topographic and structural basin bounded on the north and northwest by the North Boundary Thrust Fault, on the west by normal faulting and to the south by the Blue Hills and Ponkapoag Thrust Faults (Figure 3.1). To the southwest, intricate thrusting and tight, east plunging folds complicate the margin. The eastern margin of the basin is beneath Massachusetts Bay (Billings, 1976). Topographically the basin is bounded by low hills to the north, west, and south.

The basin is a structurally bounded depression in Precambrian basement filled with younger Mississippian and Pennsylvanian rocks (LaForge, 1932, Billings, 1976; and Kaye, 1980). At the southwest margin of the basin, the Precambrian basement outcrops in the cores of northeast plunging anticlines. To the south, between the Ponkapoag and Blue Hills Thrust Faults, the basin is intruded by the peralkaline Blue Hills Complex of Cambrian-Devonian age. The Blue Hills complex includes the Quincy Granite and other felsic intrusions. In the southwest portion of the basin, altered felsic and basaltic volcanics of the Mississippian Mattapan Complex are exposed. Volcanics of similar composition assigned to the Mississippian Lynn Complex are crosscut the Precambrian basement and are included as casts in the Pennsylvanian Boston Bay Group (LaForge, 1932).

The Boston Bay Group consists of two formations, the lower Roxbury Conglomerate and the upper Cambridge Argillite. LaForge (1932) subdivided the Roxbury Conglomerate into three members, the Squantum, Dorchester, and Brookline Members. In general, the Roxbury Conglomerate outcrops south of the Charles River over the southern portion of the basin, and the Cambridge Argillite outcrops north of the Charles River.

The Cambridge Argillite is typically a varved or rhythmically layered, indurated siltstone. Beds range in thickness from 0.1 to 8 cm, and vary from dark gray, clay to silt-rich layers, to light gray, very fine to fine-grained sand layers. Graded beds, cross beds, ripple marks, and slump structures are observed.

3.2 Structural Geology

The internal structure of the Boston Basin consists of a series of broad folds, plunging gently to the northeast or east (Billings, 1976). The MTL facility is located on the axis of the Charles River Syncline (Figure 3.1). Most of the fault

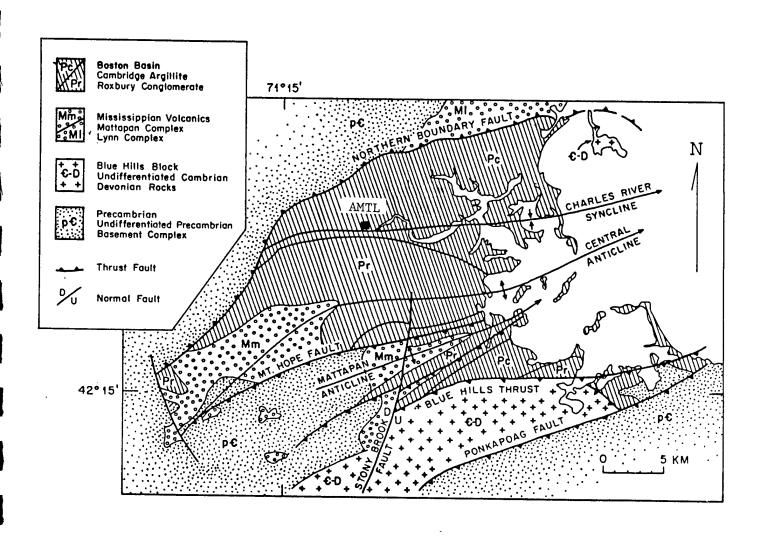


Figure 3.1 General geology of the Boston Basin (after Billings, 1976)

zones in the basin, including the bounding thrust faults, trend east-northeast. The only major exceptions to this area the Stony Brook Fault and an unnamed fault at the southwest margin of the basin, which are both normal faults and trend north-northeast and north-northwest, respectively. The Stony Brook Fault is mapped from Fresh Pond, approximately two miles east of the MTL, south-southwest for approximately 20 miles.

3.3 Quaternary Geology

Numerous glacial advances and retreats in the vicinity of the Boston Basin from 2 million years to 12,000 years ago have left a complex stratigraphic sequence of till, clay, and gravel. In general, the Quaternary aged deposits in the Boston Basin consist of (in ascending order) a basal till overlaying the bedrock, 0 to 70 feet thick, a marine clay, 0 to 60 feet thick, and outwash deposits of sand and gravel, 0 to 50 feet thick. General properties of the basal till and outwash deposits for the Boston area are summarized in Table 3.1.

General Properties of Basal Till and Outwash Deposits in the Boston Area (After Hatheway, 1982) Table 3.1

Characteristic	Lodgement (Basal) Till	Outwash
Particle Size Gradation	Well graded; very heterogeneous	Gap-graded/poorly sorted semihomogeneous
Presence of Boulders	Many, including erratics	Few to none
Percent (-) 200 Sieve	20-60	0-10
Percent (-) 0.02 mm	5-30	0-5
Effect of Fines	Governs engineering properties	Nil
Relative Density	Stiff - hard	Loose - moderately compact
Particle Shape	Angular-subangular	Subangular-rounded
Liquid Limit (%)	15-30	Non-plastic
Plasticity Index	0-20	Non-plastic
Standard Penetration (blows)	20-200+	0-20+
Cohesion (KN/m²)	0-25	approx. 0
Friction Angle (°)	15-33	25-45
Consolidation Ratio	Overconsolidated	Normal to underconsolidated
Permeability (in situ) (cm/sec)	10^{-5} to 10^{-9}	10^{-2} to 10^{-5}

4.0 Site Geology

The following description of site geology is taken from the 1988 Arthur D. Little report, "Geotechnical Report, Army Materials Technology Laboratory, Watertown, Massachusetts", unless otherwise referenced.

4.1 Site Location

The Materials Technology Laboratory is located on the north bank of the Charles River in a generally flat area, decreasing in elevation (National Geodetic Vertical Datum, 1929) from approximately 36 feet at the north to approximately 2.4 feet (river elevation) at the south (Figure 4.1). Almost the entire MTL facility is situated on a low bluff, approximately 20 feet above the river elevation.

There are no known streams or natural drainages emptying to the Charles River in the vicinity of the MTL. All surface run-off is collected in the storm drain network and discharged to the river.

The locations of bore holes and monitoring wells placed at MTL during the 1988 geotechnical investigation by Arthur D. Little are shown in Figure 4.2. Two geologic cross sections, oriented approximately northwest-southeast are presented in Figure 4.3 and 4.4.

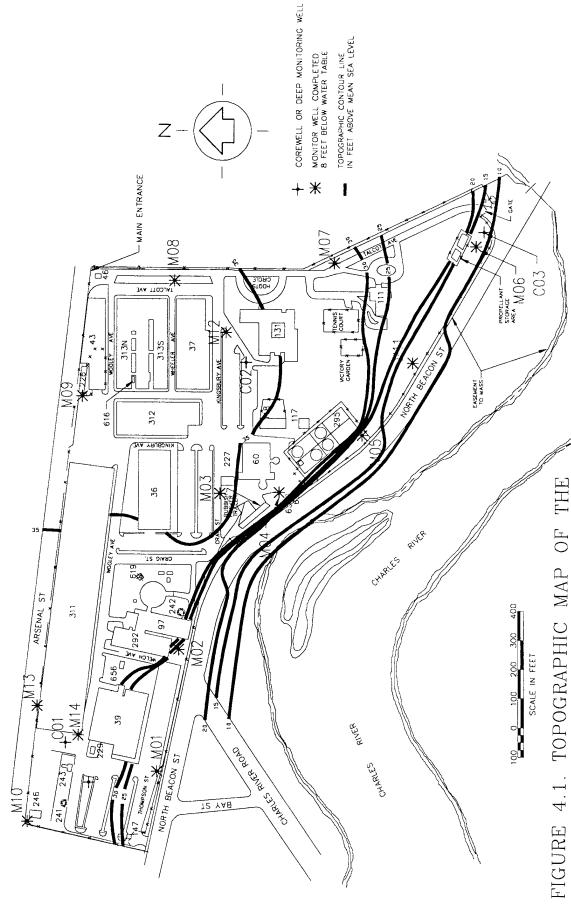
4.2 Bedrock Geology

The MTL facility is underlain by siltstone of the Pennsylvanian Cambridge Argillite. The siltstone was encountered at a depth of 61.5 feet in hole C01, at the northwest corner of the facility. At this location, the siltstone was very finely laminated with dark bluish gray silt to clay beds, and light bluish gray, very fine to fine-grained, sandy graded beds.

Observation of joints in a nearby outcrop, approximately 1 1/4 miles southwest of the facility, indicates three broad orientations:

- Parallel to bedding, oriented approximately east-west, dipping about 20-30° south;
- A dominant set, oriented north-northeast, dipping nearly vertical; and
- Parallel to sheer zones, oriented east-northeast.

The north-northeast joint orientation is also that generally followed by felsic dikes in the Boston Basin (striking N15-45°E, dipping 60-90°) and the Stony Brook Fault.



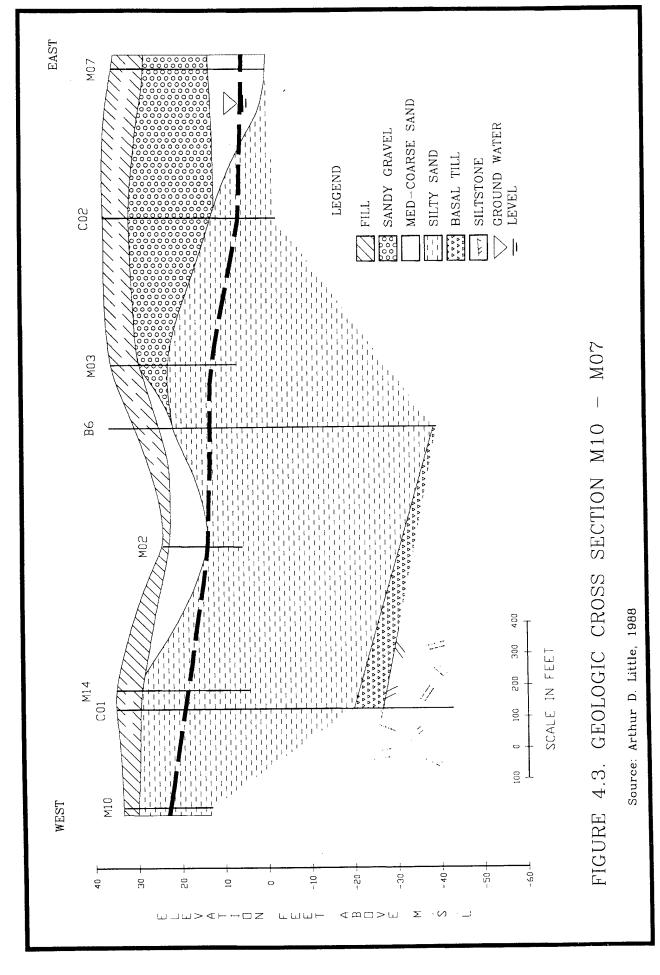
IGUKE 4.1. IUPUGKAPHIC MAP OF TE AMTL, WATERTOWN, MASSACHUSETTS

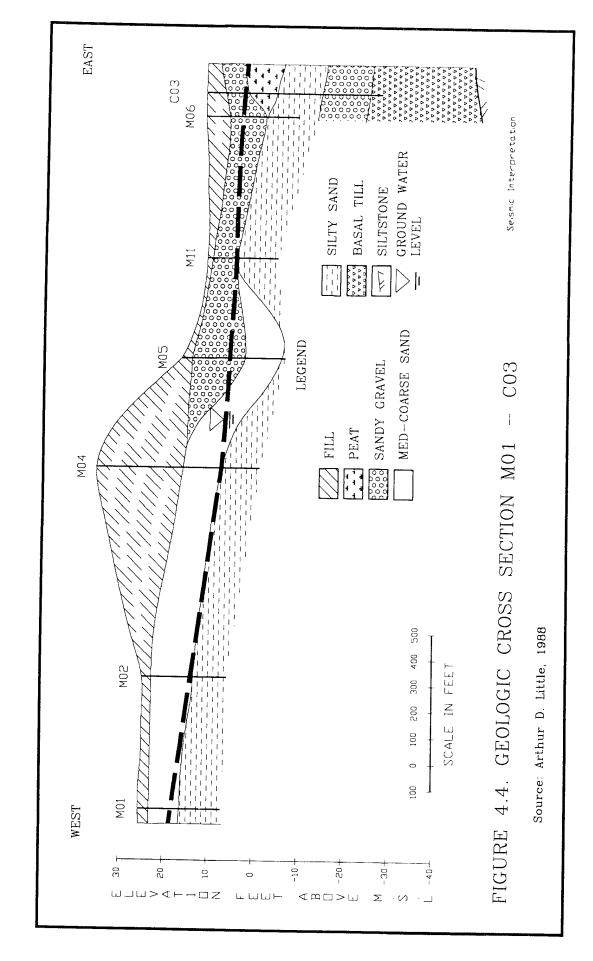
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Source: Arthur D. Little, 1988

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4.3 Quaternary Geology

Estimates based on drilling (Figure 4.3 and 4.4) and a seismic refraction survey (Figures 4.5 and 4.6), suggest approximately 45 to 120 feet of Quaternary sediments have been deposited over the Cambridge Argillite bedrock at the MTL. While the precise stratigraphy varies from hole to hole, a generalized ascending sequence consists of a basal till of fairly cohesive, silt rich gravel; a moderate to well sorted, olive brown, silty, fine-grained sand; a medium to coarse-grained brown sand, locally grading to about 30% gravel; locally a sandy peat; and finally, fill material or disturbed sand and gravel.

Depth from surface to bedrock was estimated across the site using three seismic refraction profiles (Figure 4.5). The results of these three profiles, shown in Figure 4.6, indicate a generally gently undulating surface. The east-west profile shows a bedrock surface varying from 47 feet (below surface) at the northwest corner of the facility, falling off to about 110 feet and then rising to 90 feet at the northeast corner. The north-south profiles show a decrease in depth from 120 feet at the north to about 65 feet at the south. Based on the east-west seismic refraction profile bedrock at location C01 was predicted at 57 feet; the actual depth, based on drilling was 61.5 feet.

4.3.1 Basal Till

The basal till was encountered in only two holes on site, C01 and C03 and penetrated only in C01. In C01, the till was only six feet thick and consisted of round to subround cobbles of granite and felsic volcanics and subangular fragments of argillite. No split spoon samples were obtained in the till in C01 because of refusal, so the composition of the matrix is not known. In C03, the till consisted of a gray green, silt-rich gravel with angular decomposed rock fragments and medium to coarse-grained sand. While the exact thickness of the till is not known at C03, based on the depth of bedrock estimated from the seismic refraction profile, it would appear to be approximately 25 feet thick. In drilling previously completed to gather geotechnical data for foundation design, the till was encountered in a hole approximately 200 feet west of MW03 at a depth of 76 feet. The till was described as a dense brown, clayey to silty sand with gravel.

4.3.2 Silty Sand

The silty sand is found across the site and is usually comprised of a moderate to well sorted, very fine to fine-grained sand, with a silty-clayey matrix, commonly laminated. Its thickness ranges from approximately 10 feet in C03 to 50 feet in C01. It does not appear to be encountered in MW07 or MW08 and is thinnest in C03, so it may pinch out eastward. Since it was penetrated only in these two holes, it is not possible to make any conclusions regarding systemic variations in thickness. The silty sand probably represents a distal outwash deposit in a lacustrine environment.

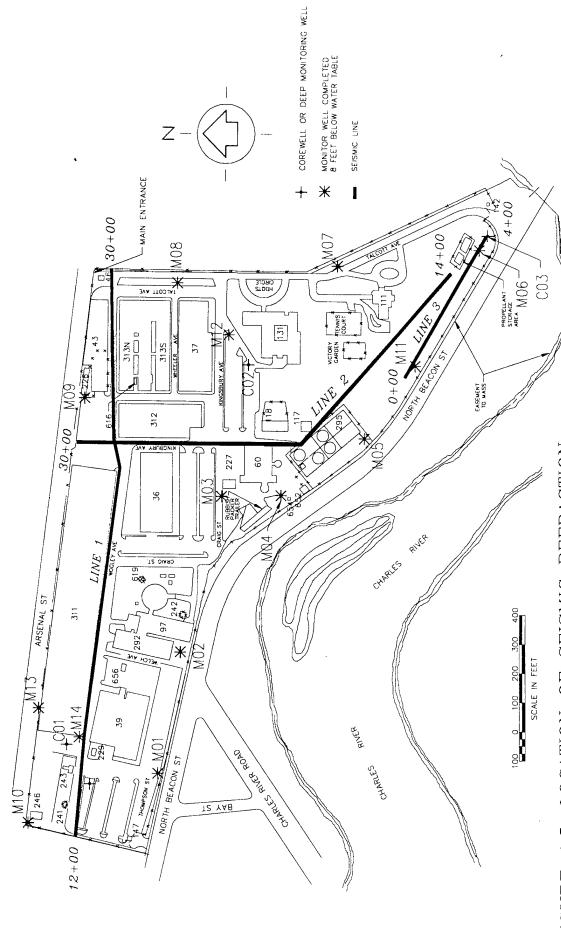
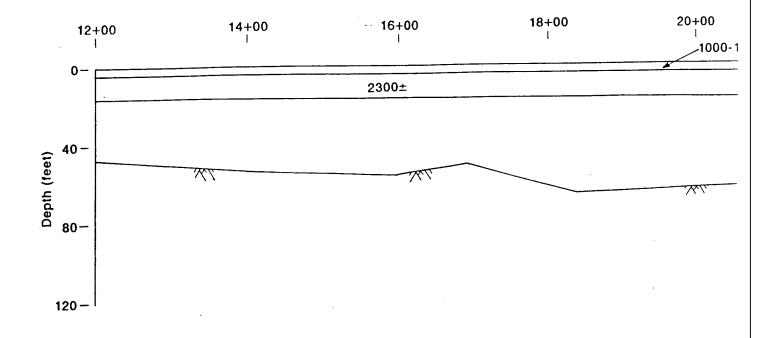
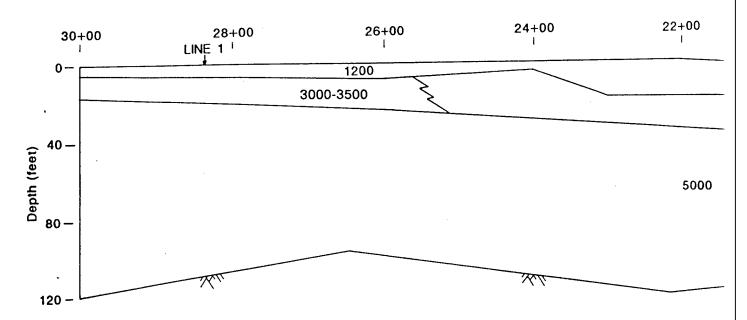


FIGURE 4.5. LOCATION OF SEISMIC REFRACTION PROFILES

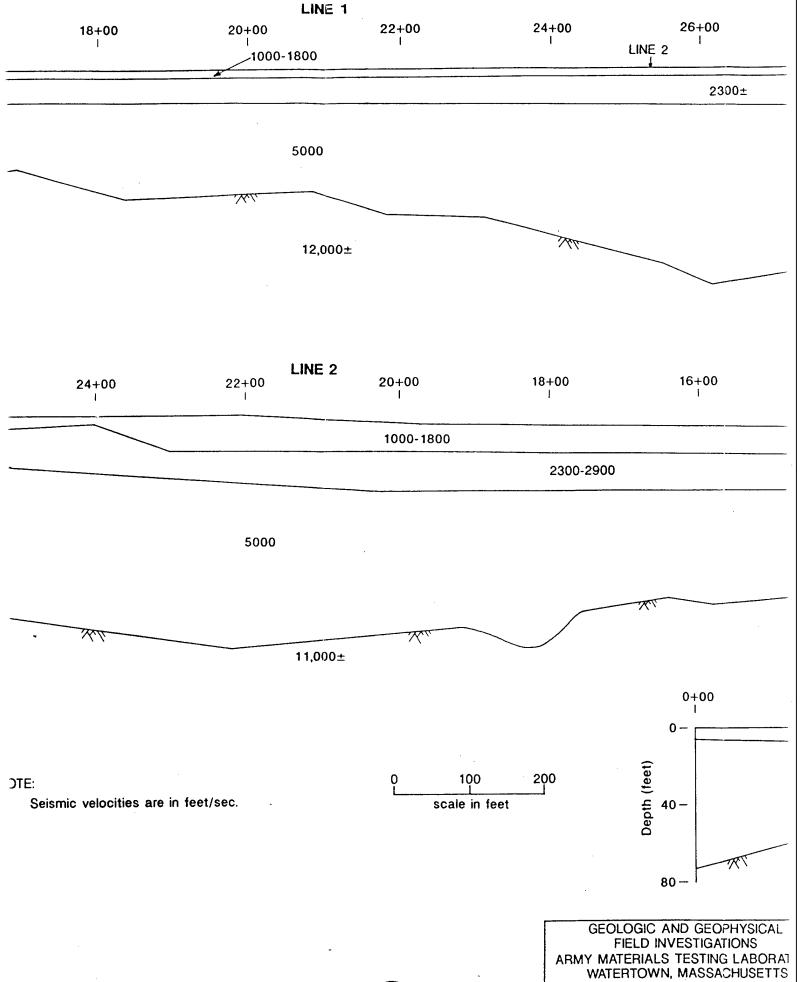
Source: Arthur D. Little, 1988



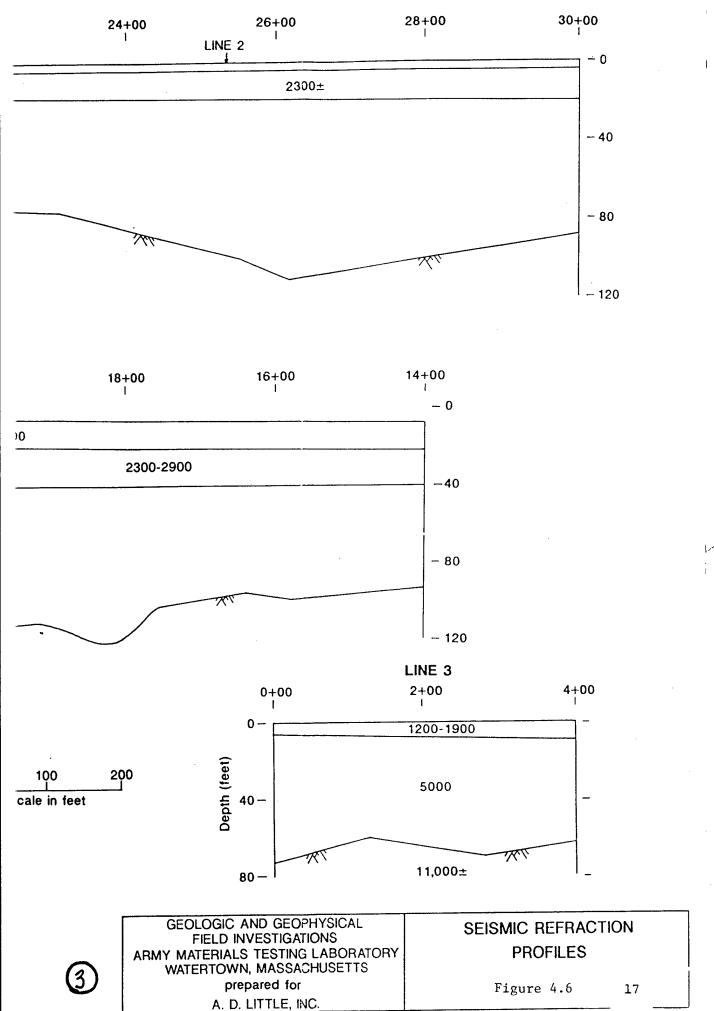


NOTE:

Seismic velocities are in feet/sec.



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4.3.3 Medium to Course Sand/Gravel

The medium to coarse-grained sand/gravel unit is highly variable in textural composition and is not found over the entire site. Where encountered, it lays above the silty sand and is overlain by fill and disturbed sands and gravels. It was not encountered in the northwest corner of the facility (Figure 4.3) and seems to grade from a medium to coarse-grain, well sorted, brown sand in the west portion of the facility to a yellowish brown, poorly sorted, gravel (30-40% pebbles and cobbles) with a poorly sorted, fine to coarse-grained sand matrix to the east. It ranges in thickness from absent to more than 35 feet, but averages approximately 10 feet. It is sometimes difficult to distinguish the gravel from disturbed or fill material, but in most cases the fill gravels were grayish brown and contained exotic debris such as brick, slag, concrete, and ceramics. The sand/gravel deposits probably represent fluvial (glacial meltwater) deposits.

4.3.4 Peat

In C03 at the southeast corner of the facility (Figure 4.4), a sequence of organic rich sand and sandy peat was encountered. This is the lowest portion of the MTL (11.9 feet), about 9 to 10 feet above normal Charles River elevation. The sandy peat probably represents a flood plain wetland deposit and consisted of grayish brown woody plant fragments and silty fine sand. When exposed to air, the peat gave off a sulfurous odor and immediately oxidized to a black brown color. Peat was not encountered in MW11 or MW06, the other low elevation hole locations.

4.3.5 Fill and Surficial Soils

Fill at the MTL facility is variable in distribution and thickness but is generally less than 20 feet. Usually the fill consists of poorly sorted sandy gravel, grayish brown in color. It commonly contains exotic debris such as brick, slag, concrete, and ceramics which can be used to distinguish it from the underlying fluvial gravels.

The surficial soil at the MTL is classified as Merrimac gravelly sand loam. It consists of 6 to 10 inches of dark brown gravelly sandy loam overlying 15 to 25 inches of yellow brown, friable gravelly sandy loam. The soil has been repeatedly disturbed during the history of the MTL by various construction activities.

4.4 Hydrology

The following description of hydrology at the MTL facility is taken from the 1988 Arthur D. Little report, Geotechnical report, Army Materials Technology Laboratory, Watertown, Massachusetts.

4.4.1 Surface Water

Surface water run-off and natural drainage at the MTL has been greatly influenced by modifications made to the natural land surface by construction of various structures and paved areas such as roads and parking lots. Watertown, in the

vicinity of the MTL, is heavily developed. The nearest pond, Swains Pond, is approximately 3,000 feet east of the MTL. The Charles River, one of the primary drainages in the Metropolitan Boston area, borders the site to the south. There are no known streams or other natural drainages to the Charles River in the vicinity of the MTL. Current surface drainage is dominantly to the storm sewer system which discharges into the river. Some natural run-off will follow topography toward the river. Natural recharge through seepage is probably quite minimal in the vicinity of the MTL because of the number of structures and paved areas.

4.4.2 Groundwater

Characterization of groundwater hydraulics at the MTL is based on 17 borings and 16 monitor wells installed at the site during May and June of 1988. Water level measurements were taken and in situ permeabilities measured by falling and rising head tests. Hydraulic parameters are summarized in Table 4.1.

Water level measurements taken at all wells and the Charles River on July 13, 1988 and February 8, 1990 (Table 4.2). Groundwater contours are estimated based on the 1988 data. These contours indicate flow is generally to the south, toward the River. In the northeast corner of the site, flow is to the southeast initially and then swings around to the south. Using the contours shown in Figure 4.7, gradients were estimated (Table 4.1). Figure 4.8 shows groundwater contours for the well measurements taken February 8, 1990.

Hydraulic conductivities (k) were calculated by the method of Hvorslev (Freeze and Cherry, 1979) using measurements of the maximum displacement of water and subsequent recoveries to equilibrium as a function of time (slug tests). The hydraulic conductivities calculated from the falling head and rising head tests are presented in Table 4.3 along with laboratory measurements of hydraulic conductivity. The results from monitor wells MW03, MW04, MW07 and MW14 are of questionable quality due to the erratic nature of the data; therefore, they are not used in our characterization of groundwater hydraulics.

The test results can be categorized based on the material in which the well was screened. Using data from monitor wells screened in silty sand (C02, C03, MW05, MW06, MW09, and MW11) an average value of k is 6.4×10^{-3} m/sec with a range from 7.06×10^{-4} to 1.30×10^{-2} cm/sec. For the medium to coarsegrained sandy gravel (MW01, MW02, MW08, MW12, and MW13) an average value of k is 2.7×10^{-2} cm/sec with a range from 4.24×10^{-3} to 3.30×10^{-2} cm/sec. These values are within expected ranges of values for silty sand (10^{-5} to 10^{-1} cm/sec) and sand (10^{-3} to 1 cm/sec) (Freeze and Cherry, 1979).

Hydraulic conductivity of the bedrock, the Cambridge Argillite (actually a siltstone), was determined by pressure testing of a packed bedrock interval (68-78 feet). Values of k ranged from 1.72×10^{-7} to 8.88×10^{-7} cm/sec and averaged 4.1 x 10^{-7} cm/sec. A value of 10^{-7} cm/sec is at the high end of the range for shale

Table 4.1 Hydraulic Parameters

1. Gradient (i)

- a. West portion: 0.025 to south.
- b. East central portion: 0.030 to southeast, swings to 0.005 to south.

2. Hydraulic Conductivity (k)

- a. Silty sand: 6.4×10^{-3} cm/sec (average) 7.06×10^{-4} - 1.30×10^{-2} cm/sec (range)
- b. Medium-coarse sandy gravel:
 2.7 x 10⁻² cm/sec (average)
 4.24 x 10⁻³ 3.30 x 10⁻² cm/sec (range)
- c. Siltstone: 4.1 x 10⁻⁷ cm/sec (average) 1.72 x 10⁻⁷ - 8.88 x 10⁻⁷ cm/sec (range)

3. Flow Rate (Q)

a. $0.016 \text{ m}^3/\text{sec } (98 \text{ gpm}).$

4. Flow Velocity (v)

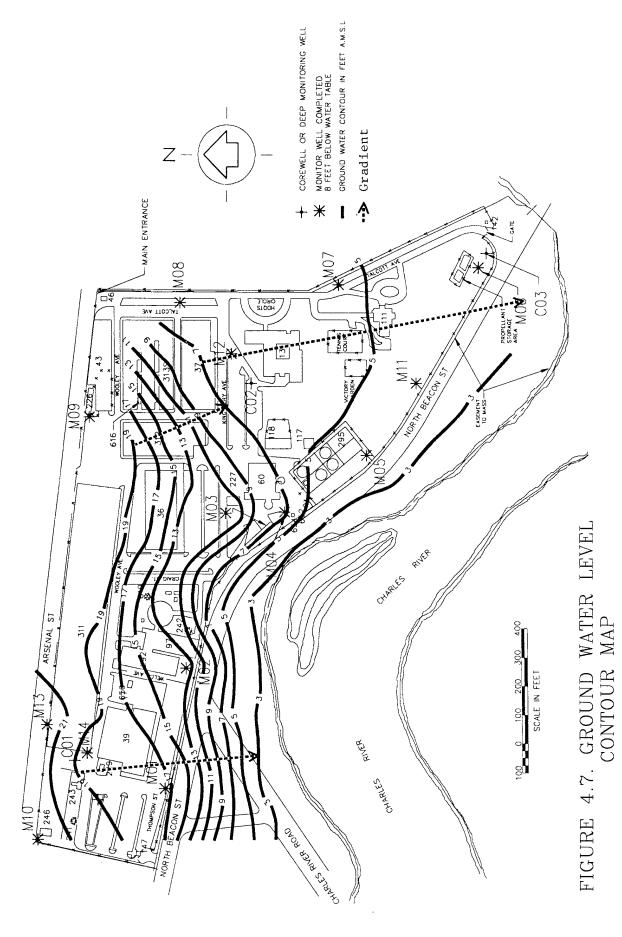
- a. Site average: 4.5×10^4 cm/sec (142 m/year).
- b. Southeast portion: 4.5 x 10⁻⁵ cm/sec (14.2 m/year).

Table 4.2 Groundwater Surface Elevations

Monitor Well	Elevation of Well* (Feet M.S.L.)	July 13, 1988 Water Depth** (Feet)	1988 Water Elevation (Feet M.S.L.)	February 8, 1990 Water Depth** W (Feet) (F	1990 Water Elevation (Feet M.S.L.)
C02	37.40	21 (2)	ì		•
700	Z+./C	51.05	2.86	30.99	6.5
CO3	11.90	8.45	3.45	8 13	3.70
M01	24.98	7.56	17.42	671	10.73
MO	27.07	0,70	77:77	0.71	18.2/
20M	t0.t2	10.49	13.55	9.25	14.79
IMIU3	36.63	23.75	12.88	22.33	14.30
M04	36.52	29.19	7 33	28.25	50.77
M05	15.93	10.82	A	77.07	77.0
90VQ	11.07	0.02	2.11	9.32	6.61
INIOO	11.96	8.15	3.81	7.44	4.52
M07	34.84	29.67	5.17	29.88	20.7
M08	39.48	33.70	87.8	20:70	/··+
MOO	37.03	11.77	5.5.5	55.13	6.33
MOTO	27.03	16.//	20.26	12.53	24.50
MOTO	32.86	11.00	21.86	9.05	23.81
M011	11.01	6.17	4.84	4.77	70.7
M012	38 52	32 17	530	77:1	†7.0 00.7
MO12	20.30	72.14	0.30	32.23	6.29
CIOINI	55.50	13.19	22.11	12.30	23.00
M014	35.49	17.19	18.30	15.54	19.95

* Elevation of well is ground surface because of flush mount.

** Depth below ground surface.



Source: Arthur D. Little, 1988

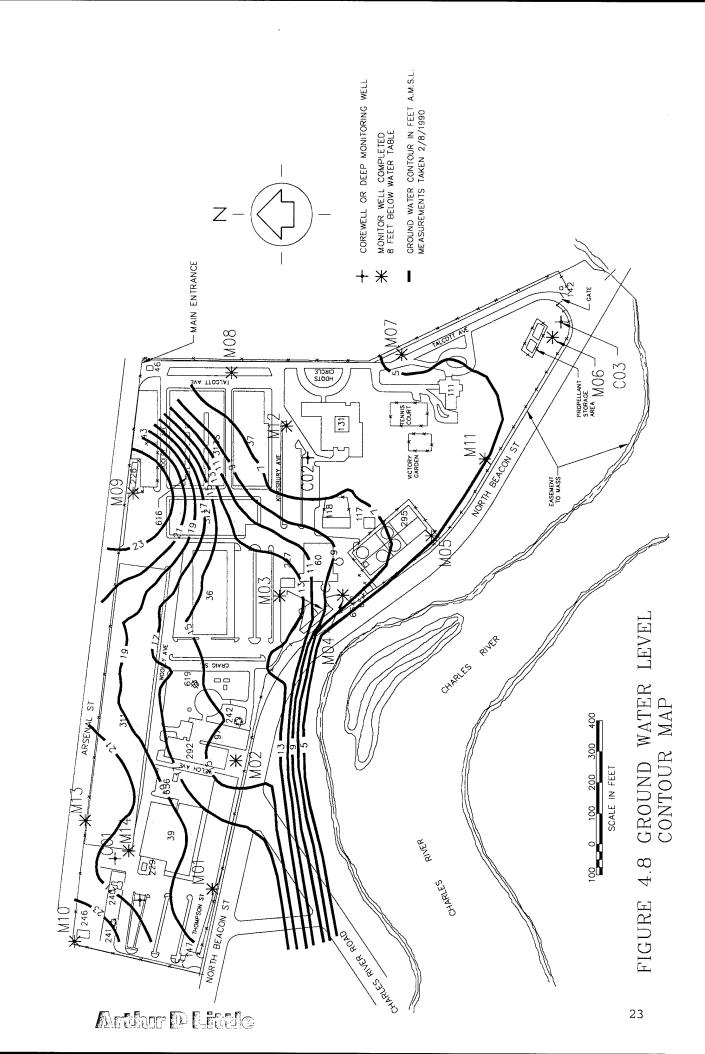


Table 4.3 Calculated in Situ Hydraulic Conductivity Measurements

Well No.	Lithology	Rising Head	Hydraulic Conductivity (cm/sec) Falling Head Laborat	(cm/sec) Laboratory
C01	Silty sand	ı	r	2.2×10^{-6}
C02	Silty sand	9.53×10^{-3}	3.35×10^{-2}	•
C03	Silty sand	9.53×10^{-3}	9.18×10^{-3}	1.0×10^{-7}
MW01	sand	1.20×10^{-2}	2.75×10^{-2}	2.5×10^{-7}
MW02		2.82×10^{-2}	3.35×10^{-3}	1.5×10^{6}
MW03		4.24×10^{-2}	*	
MW04		2.47×10^{-2}	*	ı
MW05		1.34×10^{-2}	*	ı
MW06	Silty sand	6.35×10^{-2}	1.06×10^{-3}	,
MW07		6.35×10^{-2}	*	ı
MW08		3.32×10^{-2}	1.66×10^{-2}	1
MW09		4.24×10^{-3}	3.04×10^{-2}	1
MW10	Medium sand	4.24×10^{-3}	6.71×10^{-3}	ı
MW11		7.06×10^{4}	1.41×10^{-3}	1
MW12	ım sand	3.00×10^{-2}	6.00×10^{-2}	ı
MW13		2.29×10^{-2}	3.07×10^{-2}	,
MW14	Silty sand	1.09×10^{-2}	*	6.0×10^{-7}

* Indicates erratic or insufficient data or insufficient displacement of water level.

⁻ Indicates laboratory tests could not be run.

(10⁻⁷ to 10⁻¹¹ cm/sec) confirming some fracturing is present int he siltstone, at least near the surface. Compacted natural clay liners for solid waste landfills are in the range of 10⁻⁷ to 10⁻⁸ cm/sec, so by comparison, the siltstone does provide an effective basal confining layer for the overlying aquifer in unconsolidated glacial sediments.

We did not determine an in situ hydraulic conductivity for the basal till. Values of k reported by Hatheway (1982) range from 10⁻⁵ to 10⁻⁹ cm/sec.

Locally, the hydraulics of groundwater movement beneath the site are controlled by the confining nature of the bedrock and the hydraulic conductivity of the silty sand. Groundwater shows a general gradient 0.03 to the south. West of MW03, the gradient increases slightly as the water encounters the lower conductivity of the silty sand. As the silty sand grades to coarser sand and sandy gravel eastward, the hydraulic conductivity increases and the gradient decreases.

To calculate a representative flow rate (Q), a cross sectional area perpendicular to the gradient extending from near MW01, then east to near MW03, and finally northeast to near MW08, approximately 2,000 feet in length was selected. The aquifer thickness (H) ranged from approximately 40 feet at the west to 47 feet at the east. We assumed that the siltstone provided an effective basal confining layer for the aquifer. The cross sectional flow area was estimated at 8080 m². Review of the drill logs and cross section MW10-MW07 (Figure 4-3) suggests that the silty sand is the predominate hydrologic unit. Review of the seismic fairly uniform material, based on consistent seismic velocities of 5,000 feet/sec. Based on the preceding arguments, a hydraulic conductivity of 6.4 x 10⁻³ cm/sec, the average for the silty sand, was used. An average gradient (i) of 0.03 was selected. The flow rate, Q, can now be calculated:

Q = k i A= 0.016 m³/sec (98 gpm)

 $= 504576 \text{ m}^3/\text{year} (51,508,800 \text{ gal/year})$

Representative average linear velocities can be calculated by:

v = ki/n

Using an average porosity (n) of 0.43 for the silty sand, gradients (i) of 0.03 and 0.003 and the average hydraulic conductivity (k) for the silty sand, calculated flow velocities range from 6.4 x 10⁻⁴ cm/sec (142 m/year) to 4.5 x 10⁻⁵ cm/sec (14.2m/year) where 4.5 x 10⁻⁴ cm/sec is most representative over all but the southeast corner of the site. Since the average porosity (n) determined in laboratory testing is lower than the effective porosity, these average linear velocities represent lower limits of linear velocity.

5.0 Sampling Activities

Arthur D. Little was retained by EG&G Idaho, Inc. to conduct sampling activities at the Materials Technology Laboratory, in Watertown, Massachusetts. The objective of the "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling was intended to duplicate, to the extent possible, the sampling performed in 1988. Our sampling program extended from February 8 to February 23, 1990, and consisted of the collection of the following samples:

- 18 ground water samples at 16 existing monitoring wells, which included two duplicates;
- 22 shallow soil samples, which included two duplicates;
- 3 storm sewer sediments:
- 7 outfall 24-hour composite samples;
- 8 tank and sump samples (3 sludge, 2 aqueous, 3 oil); and,
- 1 water sample from the reactor emergency coolant tank.

The final list of samples varied from the original scope in that, the water sample from the reactor emergency cooling tank was added, one 24-hour composite outfall sampling site was added, one of the sumps was dry (07AQU01), so a sludge sample was taken instead of an aqueous sample, and one sludge (05SLG01) was not taken upon direction from EG&G.

Table 5.1 lists the sample identification, type, location and compounds analyzed. Figures 5.1 through 5.5 show the locations of ground water, soil, storm sewer sediment, outfall and tank and sump samples.

Copies of original field documentation, including Ground Water Monitoring Reports, Soil Sample Logs, Monitoring Well Sampling Data Sheets, Tank and Sump Sampling Data Sheets, and Chain-of-Custody Forms are included in the tabbed appendices.

5.1 Ground Water Samples

Eighteen ground water samples were taken from 16 monitoring wells, originally installed in 1988. Of the 18, two were duplicate samples taken on the day following the original sample, without repurging the well.

Table 5.1: Proposed Samples and Analytes

Sample No.

Groundwater Samples

MW-01 CO-2 CO-3

MW-02 MW-03

MW-04

MW-05

MW-06 MW-07 **MW-08**

60-MM MW-10 MW-11 MW-12 MW-13

MW-04 duplicate C0-2 duplicate MW-14

Analysis to be Performed

Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis¹ Complete analysis¹ Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis¹ Complete analysis1 Complete analysis¹ Complete analysis¹ Complete analysis1 Complete analysis¹ Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis1

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Sample No.	Sample Location	Depth	Analysis to be Performed
Shallow Soil Samples			
0150L01	W side of Bidg. 243	1-6 inches	Complete analysis ¹
02SOL01	Steel floor Bldg. 311	1-6 inches	Complete analysis ¹
03SOL01	Transformer Case, NW side	1-6 inches	PCB
	Bldg. 43		1
06SUB01	S of Bldg 100	6-18 inches	Complete analysis ¹
06SOL01	Transformer area	1-6 inches	PCB
	NE side of Bldg. 100		
09SOL01	Transformer cage	1-6 inches	PCB
	W side of Bldg. 313		
09SOL02	Transformer cage	1-6 inches	PCB
	E side of Bldg, 313		
12SUB01	Grass area S of Bldg. 60	6-18 inches	Complete analysis ¹
13SOL01	Transformer area, S of Bldg. 131	1-6 inches	PCB
14SUB01	SE Corner, unit 14	6-18 inches	Complete analysis ¹
14SUB02	NW corner, unit 14	1-6 inches	Complete analysis ¹
15SOL01	SE corner, unit 15	1-6 inches	Complete analysis ¹
15SOL02	NW corner, unit 15	1-6 inches	Complete analysis ¹
17SUB01	W third, unit 17	6-18 inches	Complete analysis ¹
17SUB02	Center, unit 17	6-18 inches	Complete analysis ¹
17SUB03	E third, unit 17	6-18 inches	Complete analysis ¹
17SOL01	E third, unit 17	1-6 inches	Complete analysis ¹
17SOL02	Middle third, unit 17	1-6 inches	Complete analysis ¹
01SOL01	W side of Bldg. 243	1-6 inches	Complete analysis ¹
duplicate			
06SUB01	S of Bldg. 100	6-18 inches	Complete analysis ¹
duplicate			

Table 5.1 (continued)

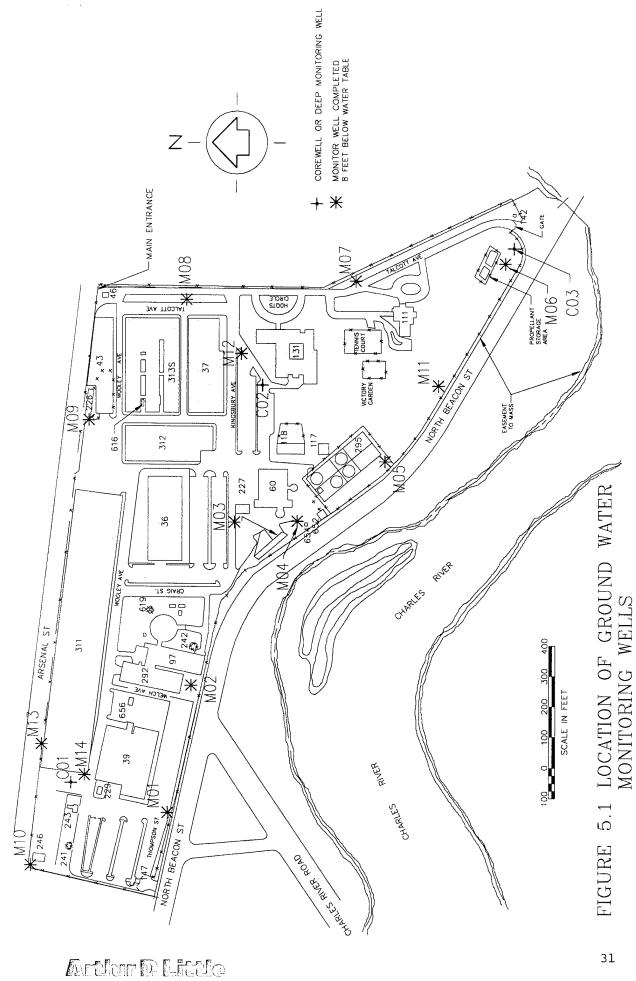
Sample No.	Sample Location	Sample Type	Sample Type Analysis to be Performed
Storm Sewer Samples			
01SED01 09SLG01 12SLG01	Storms sewer, NW corner unit 1 Storm sewer, corner of Wooley and Talcott Storm drain, unit 12	Sediment Sediment Sediment	Complete analysis¹ Complete analysis¹ Complete analysis¹
Tank and Sump Samples			
01AQUO1 030IL.01 030IL.02 03SLG01 05SLG02 050IL.01 06AQU01 07AQU01	Sump, E side of Bldg. 243 W tank, Bldg. 226 E tank, Bldg. 226 Floor, Bldg. 226 Sewer cleanout W side Bldg. 39 Tank, E side of Bldg. 39 Underground tank, SE of Reactor Sump, Bldg. 36	Liquid Oil Oil Sludge Sludge Oil Liquid	Complete analysis¹
USACOUI	Cistern under bidg. 313C	Liquid	Complete analysis:

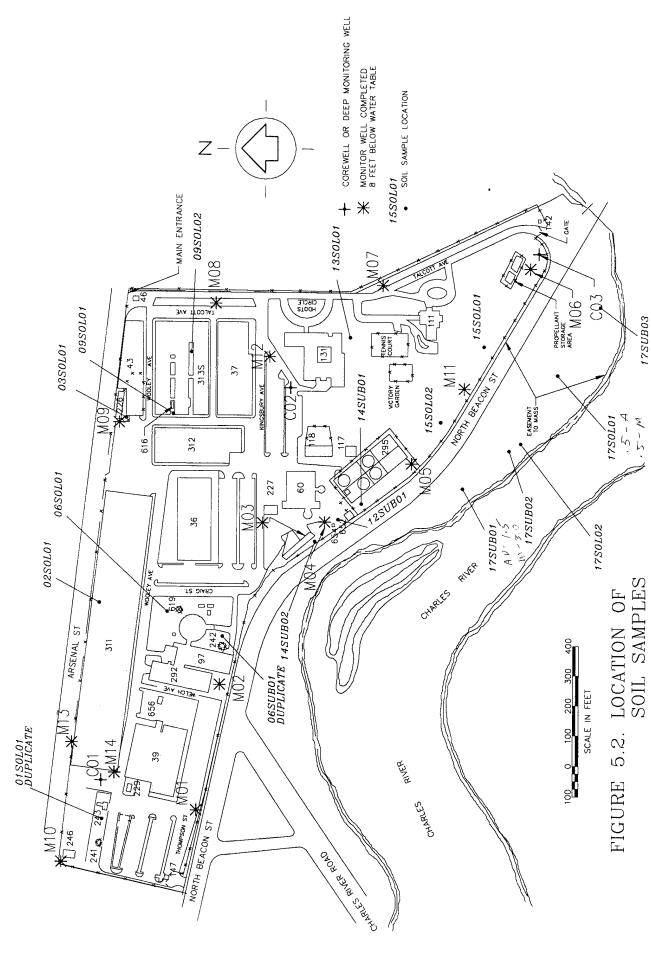
Table 5.1 (continued)

Sample No.	Sample Location	Depth	Analysis to be Performed
Sewer Outfall Samples (24 Hour Composite)	So		
16AQU01 17AQU01 17AQU02 18AQU01 18AQU03 18AQU03	SE Guard Gate, Bldg. 42 SE of Bldg. 6252 E of Tank Farm E of MW-01, Parking Lot S of Bldg. 39 Wooley Ave, NE Corner Bldg. 292 Lawn S of Reactor E of MW-02, SE Corner Bldg. 292		Complete analysis¹
TB FB	Trip blanks with volatile organic samples Field blanks - 2 for soil and 2 for ground water	As required	Volatile organics Complete analysis ¹

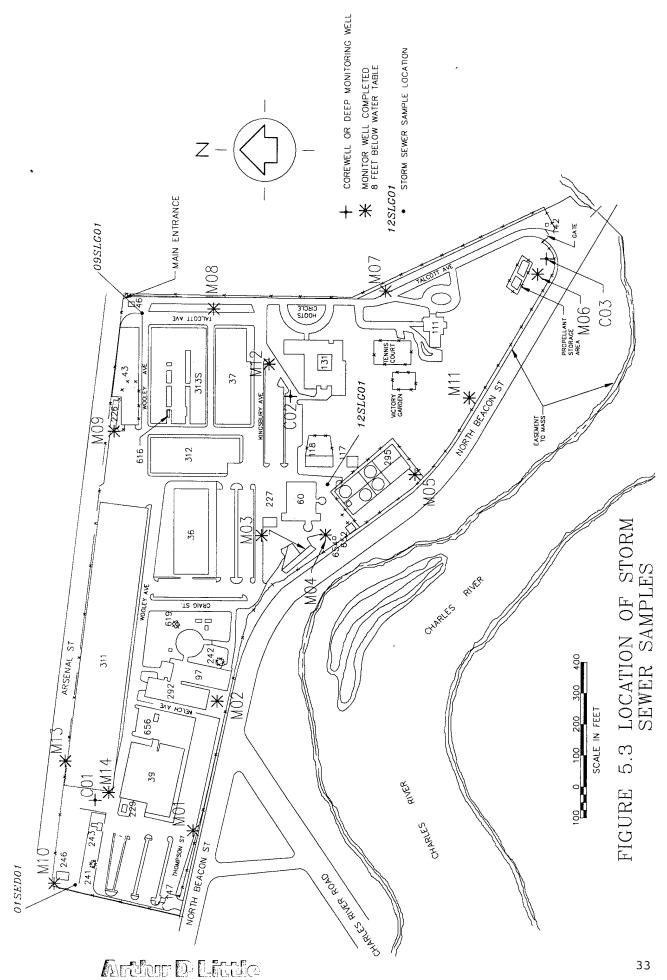
¹Complete analysis includes volatile organics, semivolatile organics, (base/neutral/acid extractables), pesticides, PCBs, metal (A1, Sb, As, Ba, Be, Cd, Cu, Cr, Co, Ca, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, T1, U, Sm, V, Zn), cyanide, and sulfide.

Metals analysis of groundwater samples refers to dissolved metals.

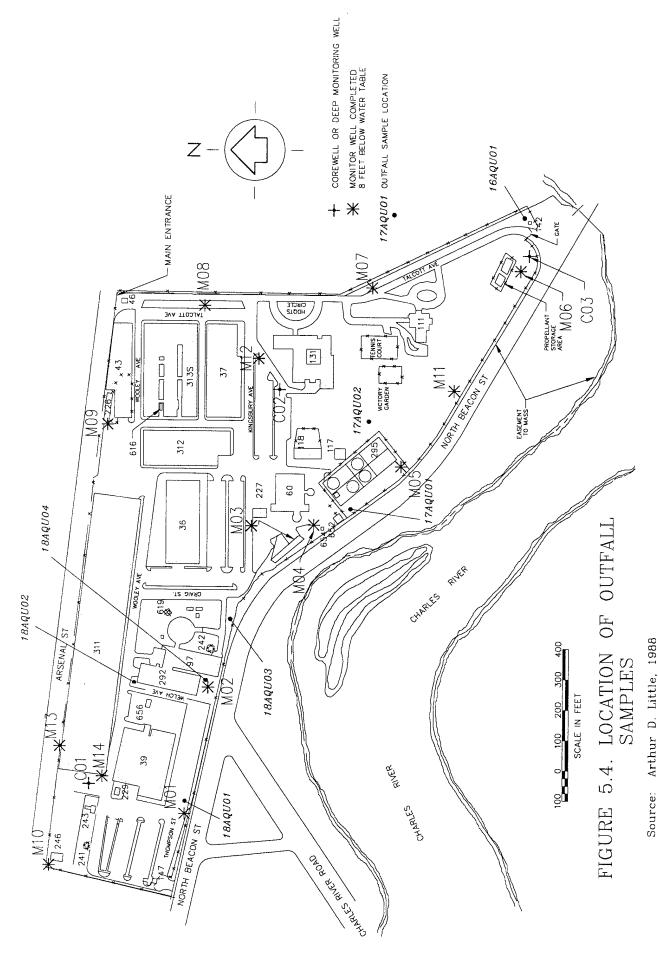




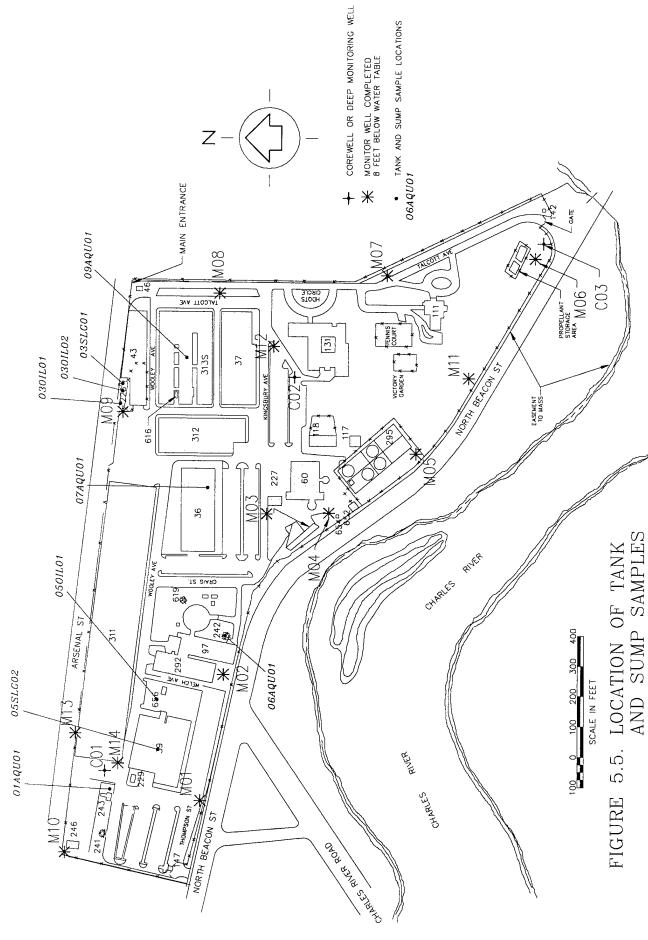
Source: Arthur D. Little, 1988



Source: Arthur D. Little, 1988



Arthur P Little



35

Source: Arthur D. Little, 1988

5.1.1 Methods

All wells were opened in the presence of the site health and safety officer, and the head space monitored with an HNu P-101 photoionization detector for the presence of volatile organic compounds. Readings are recorded on the water level sheets. Only well CO-2 registered above background, at approximately 200 ppm. The site health and safety officer declared that well CO-2 would be sampled with level C protection. Water levels were then measured using a Solinst electric water level probe. All wells were opened, monitored and measured (water levels) on March 8.

Wells were purged by removing 5 well and annular space (assuming 30% porosity) volumes, using a decontaminated submersible pump. Water was observed for suspended solids, temperature, pH and conductivity stabilization. Meters were calibrated according to the frequencies specified in Table 5.2. Purging was completed when the desired volume of water was removed or the well pumped dry. Well MW-03 was purged with a stainless steel bailer until it went dry. Purge water was containerized in DOT-approved 55 gallon drums and labeled with date, well number, and number of drum on both the drum and the lid.

All wells were sampled using a Teflon or stainless steel bailer which was decontaminated between wells. Samples were immediately collected for volatile organic compounds by gently pouring well water into two 40 ml, amber glass bottles with Teflon septa caps. The bottle was sealed and checked to insure that no air bubbles were trapped in the bottle. Subsequent samples were collected for semivolatile organic compounds, cyanide, pesticides/PCBs, sulfide, and metals. Sample containers used for each sample are listed in Table 5.3. Water samples taken for metals were poured into a dedicated, clean glass bottle (previously rinsed with water from the well), and filtered utilizing clean Teflon tubing, a peristaltic pump and a 45 micron SamplePro filter. Samples were preserved according to the procedures listed in Table 5.4, labeled and placed in coolers with ice. A chain-of-custody was filled out, the cooler was monitored for radioactivity using a Geiger Muller meter (all samples passed the screening), and then the cooler was sealed. At the end of each day the coolers were transported by the field crew to the Arthur D. Little analytical laboratory in Cambridge.

Sample labels were filled out and preservatives added to the sample containers in a field office set up by Arthur D. Little at the MTL. During purging, the well waters were tested for free chlorine, using potassium iodide test paper, for sulfide using lead acetate paper, pH, conductivity, and temperature. The presence of either chloride or sulfide require a different procedure for sample perservation. No chloride or sulfide were detected in any of the ground water samples collected. so routine preservation procedures were used.

Duplicate samples were collected for wells CO-2 and MW-04 on the day following the first sample. After the collection of the duplicate samples, equipment blanks

Table 5.3: Sample Container, Preservation and Holding Time

		1		
Analytes	Matrix	Bottle Size	Preservation	Holding Time
TCL+30 Volatile Organics	Soil	40mL VOA (3)	Cool <4°C	14 days
TCL+30 Semi Volatile Organics	Soil	1 x 1L Amber	Cool <4°C	7 Days (extraction) 40 Days (to analysis)
PCBs	Soil	1 x 1L Amber	Cool <4°C	7 Days
Cyanide	Soil	1 x 250 mL Amber	Cool <4°C	14 Days
Metals/TCL Metals	Soil	1 x 500 mLAmber	Cool <4°C	28 Days
TCL+30 Volatile Organics	Water	40 mL VOA (3)	HCL pH <2 Na ₂ S ₂ O ₃ if free C1 Cool <4°C	14 Days
TCL+30 Semi Volatile Organics	Water	1 x 1 gal Amber	Na ₂ S ₂ O ₃ if free C1 Cool <4°C	7 Days
Cyanide	Water	1 x 1 L Polyeth	Cool <4°C Test for sulfide with lead acetate paper, Codmium Nitrate if present NaOH pH<12 0.6 gm Ascorbid Acid if free C1	14 Days
Sulfide	Water	1 x 1 L Polyeth	2mL/L 2N ZnAcetate NaOH pH >9 Cool <4°C	7 Days
Metals/TCL Metals	Water	1 x 1 Polyeth	HNO, pH<2	28 Days

Table 5.4: Water Sample Preservation

Volatiles - Test for presence of free chlorine using potassium iodide test

paper. If present add sodium thiosulfate at level of 0.008% per Liter (1 drop 1N/40mL). Adjust pH of solution to pH <2 with

HCL (4 - 6 drops conc HCL/40mL).

Semi-volatile - Test for presence of free chlorine using potassium iodide test

paper. If present, add sodium thiosulfate at level of 0.008%

per Liter (2mL/Gal).

Cyanide - Test for presence of sulfide with lead acetate paper. If present,

add cadmium nitrate until sulfide no longer detected. Test for presence of free chlorine with potassium iodide paper. If present, add ascorbic acid at rate of 0.6 gm per Liter. Add

Sodium Hydroxide to pH > 12 (2-5 mL/Liter).

Sulfide - Add 2 mL/Liter of 2N Zinc Acetate solution.

Add NaOH to pH>9 (2-4 mL/Liter)

Metals - Add HNO₃ to pH<2 (2-5 mL/Liter)

(2) were taken by decontaminating the bailer and then capturing distilled, deionized water passed through the bailer.

The bailers were decontaminated between each well by triple rinsing in distilled, deionized water. The clean bailers were wrapped in aluminum foil to prevent contamination during transport and handling between wells. PVC gloves were used to handle all clean equipment. Dedicated bailer twine was used for each well. Rinse water was collected and drummed in the same manner as the purge water.

5.1.2 Modifications

The only modifications to the original work plan were the use of a stainless steel bailer in addition to the Teflon bailer and the need for level C protection in the collection of the sample and duplicate for well CO-2.

5.2 Soil Samples

Twenty-two shallow soil samples were taken from locations specified by EG&G, approved by USATHAMA and staked by the Arthur D. Little Project Manager. Two of the 22 samples were duplicates. These sample locations correspond to original soil sampling locations.

5.2.1 Methods

All soil samples were collected using a decontaminated 3-inch stainless steel bucket-type hand auger. An area approximately 6 inches in diameter was cut in the sod using a decontaminated stainless steel trowel to remove the sod and root zone from the sample area. Surface soil samples were taken at a depth from approximately 1 to 6 inches depth; subsurface samples were taken at approximately 6 to 18 inches depth. To obtain the desired volume, several holes were made adjacent to one another. The sample for volatile organic compounds was taken immediately by rapidly filling 2 40ml amber, glass bottles as full as possible to eliminate head space, and capped with a Teflon septa seal. Subsequent samples were taken for semivolatile organic compounds, pesticides/PCBs, metals, cyanide, and sulfide. Five samples, taken adjacent to transformers, were taken only for PCBs (03SOL01, 06SOL01, 09SOL01, 09SOL02, and 13SOL01). Sample containers used are listed in Table 5.3. Sample containers were labeled, placed in a cooler with ice, a chain-of-custody was filled out, the cooler was monitored for radioactivity with a Geiger Muller meter (all samples passed the screening), and then sealed. At the end of each day, the field crew transported the cooler to the Arthur D. Little analytical laboratory in Cambridge.

Duplicate samples were collected at 01SOL01 and 06SUB01.

The soil auger and trowel were decontaminated by first scrubbing the equipment with a nylon-bristle brush to remove soil and debris adhering to the equipment.

They were next scrubbed with MTL tap water and a nylon-bristle brush, and finally triple rinsed in distilled, deionized water. Decontaminated equipment was wrapped in aluminum foil to prevent contamination during transport and handling between sites. All clean equipment was handled with latex rubber or PVC gloves.

5.2.2 Modifications

The only modification to the original work plan involved the taking of the equipment blanks. Normally these are taken after a piece of sampling equipment is decontaminated after the last event of the day or after a site suspected to be contaminated is sampled. We specified taking the equipment blank after the duplicate samples. This was inadvertently omitted by the field crew. To correct this omission, each duplicate sample site (01SOL01 and 06SUB01) was resampled, the sample discarded, the hand auger decontaminated according the specified procedure, and an equipment blank taken by passing distilled, deionized water through the auger bucket, and collecting it in the proper sample containers. A memorandum documenting this event is included with the chain-of-custody record.

5.3 Storm Sewer Sediment Samples

Three storm sewer sediment samples were collected from storm sewer catch basins at locations specified by EG&G and approved by USATHAMA. These sample locations correspond to original sampling locations.

5.3.1 Methods

Prior to removing the storm sewer grate, the catch basin was monitored for radioactivity with a Geiger Muller meter and for volatile organic compounds with an HNu P-101 photoionization detector. All catch basins were approved for sampling. The grate was then removed and a sediment sample taken. Samples were taken using a decontaminated Pyrex glass beaker attached with a stainless steel clamp to a wood extension pole. Sample containers used were the same as that specified for soil samples in Table 5.3.

The first sample taken was for volatile organic compounds; subsequent samples were taken for semivolatile organic compounds, pesticides/PCBs, cyanide, and sulfide. Samples were labeled, placed in a cooler with ice, a chain-of-custody completed, monitored for radioactivity with a Geiger Muller meter (all samples passed the screening), and then sealed. At the end of the day the sample cooler was transported to the Arthur D. Little analytical laboratory by the field crew.

No duplicate samples were taken as none were required in the scope of work.

Decontamination of the Pyrex beaker used for sampling was performed using the procedure described previously for the soil sampling equipment.

5.4 Outfall 24-Hour Composite Samples

Seven outfalls were sampled by collecting a 24-hour composite sample at each outfall location. The outfalls were all on the MTL property at locations designated by EG&G, and approved by USATHAMA. These samples correspond to original sample locations.

5.4.1 Methods

To guarantee the security of the samples, they were taken manually rather than with an automatic sampler. The 24-hour composite was developed by taking a subsample at 4 hour intervals on February 22 and 23, at 2130 hr., 0130 hr., 0530 hr., 0930 hr., 1330 hr., and 1730 hr. Using a decontaminated stainless steel dipper, 1.5 liters was obtained of the discharge flowing from the pipe and placed into a clean 10 liter glass compositing jar, one for each outfall. As there was no flow in the outfall for sample 17AQU01, standing fluid was sampled from the sump. Samples for volatile organic compounds were taken as a single sample during the initial February 22 2130 hour event. Samples for semivolatile organic compounds, pesticides/PCBs, metals, cyanide and sulfide were taken as aliquots from the 10 liter compositing jar at the end of the 24-hour event. Samples were placed in containers and preserved according to the specifications in Tables 5.3 and 5.4 for water samples. Metals were not filtered, however, since it was felt that particulate transport of adsorbed metals was a significant transport mechanism for the discharge. Samples were labeled, placed into a cooler with ice, a chain-ofcustody completed, the cooler was monitored for radioactivity using a Geiger Muller meter (all samples passed the screening) and the cooler then sealed. At the end of the 24-hour sampling event, the coolers were transported to the Arthur D. Little laboratory in Cambridge.

No duplicate samples were taken, as none were required in the scope of work.

The stainless steel dipper was decontaminated between outfalls by triple rinsing in distilled deionized water.

5.4.2 Modifications

In the work plan we had specified taking the subsamples from the outfall with a Pyrex glass beaker, but due to equipment availability were able to use a stainless steel dipper designed for such sampling. We had also suggested in the original sampling plan that 2 samples be taken for volatile organic compounds, one during the night and one during the day to capture diurnal variations in the discharge that might be due to variation in the operations at MTL over the 24 day. At the direction of EG&G, only one sample for volatile organic compounds was taken from each outfall.

5.5 Tank and Sump Samples

Eight samples were taken from tanks and sumps; 3 sludge samples, 2 aqueous samples and 3 oil samples.

5.5.1 Methods

Prior to sampling, all tanks or sumps were monitored with an HNu P-101 photoionization detector. The three sludge samples (05SLG02, 03SLG01, and 07AQU01 - no fluid in sump so a sludge sample was taken) were collected using a decontaminated Pyrex glass beaker and filling the appropriate sample container listed in Table 5.3 for soils. Samples for volatile organic compounds were taken first.

The two aqueous samples (01AQU01 and 09AQU01) were taken with a decontaminated bailer. Aqueous samples were placed in the appropriate sample containers as listed for water in Table 5.3, and preserved according to the specifications of Table 5.4.

The 3 samples of oil were obtained with a dedicated, decontaminated Teflon bailer, accessing the tanks through the vent stacks. Portions of the piping were removed by MTL staff to facilitate the sampling. Samples for volatile organic compounds were taken first using 2 40 ml amber, glass bottles with Teflon septa screw caps. Care was taken to make sure that no air remained in the sample bottle. An additional 500ml amber, glass bottle was filled for the remaining analytical requirements: semivolatile organic compounds, pesticides/PCBs, metals, cyanide, and sulfide.

5.5.2 Modifications

A sample originally designated for a storm sewer clean-out under Building 39 (05SLG01) was not taken at the direction of EG&G, since there was no flow or sludge. A sample from a sump in the basement of Building 36 (07AQU01) which was originally designated as an aqueous sample was taken as a sludge sample, at the direction of EG&G, since there was no liquid in the sump. While our work plan assumed all sampling would be at level D, and excluded confined space entry work, a sludge sample taken from the tank vault (03SLG01) was taken under the supervision of the site health and safety officer, with the sampler wearing an SCBA. Entry was made after the tank vault had been suitably ventilated, using Arthur D. Little's procedures for confined space entry.

5.6 Water Sample from the Reactor Emergency Coolant Tank

Two water samples were taken from the reactor emergency coolant tank.

5.6.1 Methods

Two water samples were taken from the emergency reactor coolant tank by the site health and safety officer, who is also Arthur D. Little's Radiation Safety Officer. Before the sample was taken, the tank was monitored with a Geiger Muller detector for radioactivity; no abnormal readings were detected. The samples were taken by immersing a 1 gallon, amber glass sample bottle in the tank. Access to the tank was gained through a trap door. The samples were preserved by adjusting the pH to less than 2.0 with nitric acid. The samples were labeled, screened for radioactivity with a Geiger Muller meter, placed in a cooler with ice, a chain-of-custody completed and the cooler sealed. The cooler was transported to the Arthur D. Little analytical laboratory in Cambridge by the field crew.

5.6.2 Modifications

Two samples were taken from the cistern. One was included in the original scope of work and one sample was not included. The sample called for in the sampling plan was taken and analyzed for non-radiological contamination. The additional sample was taken by Arthur D. Little personnel, then shipped to EG&G Idaho for radiological analysis.

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Date Ir	nstalled Measu ption	D Little uring Poi	nt	Мо	Equ HNa NO Sikgrown	ed ing and uipment	Sampling Used	Well No. C-02 Client £ 6+6 Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Rema		Read By	
1520,90	1120	200	37.49	30 113"	,6.5		HALL reading in well will were some	n 14 = Joseph - Benthuy Zone O.Sppm	RNL	
				38.99			Modified Level D	For well purging is necessary.	1	
							compositions hegin.	ompared it deemed now scary	9017	
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1				<i>C</i>	round	ł Wo	tor	Well No. 003	
Λ	rtlur I) Little	e					Client E&+5	
j				IVIO	nitorii	ng Ke	eport	Project	
Data I	nstalled			D=4	D			Case No.	
Date ii	istaneu		······································	Date	Develop		<i>G</i> ::	LOCATION	1
		uring Poi			Measur Equ HMy PID	ing and ipment	Sampling Used		
Descri Elevat	iption $\frac{F}{-}$	lush wheell	Mount		Book your! Electric G	o-boph lack Lac	. Moter		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	I	Remarks	Read By
3-(3-7)	1312	0.6	11 90	8,17,	3.78				CBM
<u> </u>				8 125					
<u> </u>									
									
									
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									+
									+
		<u>-</u>							

Date I	nstalled Meas iption	Uring Poi	int	Mo	Develop Measur Equ HNU FID RECKGROND Electric W	ng Re	Well No. Mw-o Client E G+G Project Case No. LOCATIO	Client EG+G Project		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	emarks	Read By	
1-8-70	\$1030	0.5	24.98	681	18 27				RNL	
				6.71						
	<u>'</u>									
· · · · · · · · · · · · · · · · · · ·									-	
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Date II	nstalled Measi	D Little	nt		lo	Develop Measur Equ HNL PIC Bockgrow Electric	ed ing and sipment	Well No. MW-02 Client E6+6 Project Case No. 4453 LOCATION	Client EG+G- Project		
Date	Time	Total Organics (ppm)	Measuring Point	Dep To Wat	0	Water Surface Elevation	Total Well Depth	Rem	arks	Read By	
J-8-70	1038	طارن	24.04	9'3	3"	14 79				RIIL	
				9.2	.5						
1											
,											
-											
							:				
				-	-						

1											

Date II	nstalled Measu	P Little uring Poi	nt	Mo Date	Develop Measur Equ H 112 PID Bukyound a Electric Wa	ed ing and uipment	Sampling Used	Well No. MW-03 Client E6+6 Project Case No. 6+453 LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth		Remarks	Read By
		0.5	36.63	22.33	14.30				RHL

Well No. MW-04 **Ground Water** Client E646 **Artiur D Little Monitoring Report** Project Case No. 61453 Date Installed **Date Developed** LOCATION Measuring and Sampling Equipment Used **Measuring Point** HHLL PID Calibrated at 0830 Description Flush what mant Elevation Britymind Oldppm Electric Witter Level Maker Total Depth Water Total Measuring Date Time Read Organics Well Remarks To Surface Point $\mathbf{B}\mathbf{y}$ (ppm) Water | Elevation | Depth 0F-30-6 1054 2813" 0.6 36 52 RNL 28.25

Date II	nstalled Measi			Mo	Develop Measur Equation (A)	ed ing and uipment	Sampling Used	Well No. MW-05 Client Long- Project Case No. LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Ren	arks	Read By
, 1 - 0 K - 1 V	1340		15.43	7 3 4 7 3 4	661				L, NL

Date	Installe Mea	d suring P	oint	ent	Dai	onito te Deve Meas	ring loped Suring a	Vater Report Ind Sampling ent Used Area (A35)	Well No. My - 06 Client (6+6- Project Case No. LOCATION			
Date	Time	Total Organi (ppm)	cs Mea	suring oint	Depth To Water	Surfa		u	Remai	rks	Re	
).×.0	1376	0.6	[1 9	6	7'54	4.5					В	
<u> </u>		 	 		7.44						CBI	/V)
			ļ		·							
	 		 									
							-					
							-					
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												4
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Date II	nstalled $oldsymbol{ ext{Meass}}$	uring Poi	nt	Mo Date	Develope Measur Equal Na PID Scikgand Elante	ed ing and sipment	Sampling Used 2 (0830	Well No. 1960 of Client 19646 Project Case No. LOCATION	
Date	(ppm) Po		Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	R	emarks	Read By
) - UN - 40	130)	00	34.84	39' Wj"	4.97				RNL
				29.88					
						- · · · · · · · · · · · · · · · · · · ·			
									
									+

Date I	Installed Meas	D Little uring Poi	nt	Mo	Develop Measur Equ HNU PIP (Suckgrand Electric (ed ing and	Sampling Used	Well No. MW-08 Client E646 Project Case No. LOCATION			
Date	(ppm) Point			Depth To Water	Water Surface Elevation	Total Well Depth	Ren	narks	Read By		
3-45-90	1146	0.6	3 9 .48	33'12"					RNL		
				33 I 5							
						! 					
									+		
									-		
									-		
 									+		
									-		
									-		
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Date II	Date Installed Measuring Point Description Floridation Date Time Total Organics Point				Develop Measur Equal HAL PID Backguck	ed ing and sipment	Well No. My Client E6+6 Project Case No. UN	153		
Date	Time			Depth Water Total To Surface Well Water Elevation Depth				Remarks		
J-08-50	1154	0.6	37.03	12'63"	24.50				RNL	
				12.53					1 ////	
			·							
	· · · · · · · · · · · · · · · · · · ·									
) — — — <u> </u>										
							· · · · · · · · · · · · · · · · · · ·			
 										

Date Ir	nstalled Measu ption F	P Little uring Poi	nt	Mo	Develop Measur Equality PIO -	ed ing and lipment	Sampling Used	Well No. MW-10 Client EG+G Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Res	Read By		
2-8-90	0953	طارن	Flush w well mount	95"					RHL	
1			32.86	9.05	23.81					
			32.04	7.03	2 7 . 81					
1										
	·									
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Date In	stalled Measi	P Little		Mo	Develop Measur Equation (A)	ed ing and ipment	Sampling Used	Well No. TWOCH Client E646 Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	marks	Read By	
	(353)		11.01	4.77	6.24				KIL	

Date In	nstalled Measi	D Little	nt	Date Developed Measuring and Sampling Equipment Used HNa PIE Chlock in OSSO Backgood OS pm E bette Water Lawl Mater					Well No. 1 W-12 Client E6+6 Project Case No. 61453 LOCATION		
Date	Time Organics (ppm) Measur Poin O 1131 O.5 38.5			To	Water Surface Elevation	Total Well Depth		Remarks			
			38 5 2	32'33"	6.29						E MY

ese	nstalled Measi	D Little uring Poi	nt	Mo Date	Eqi () Hu Pib	ed ring and uipmen	Sampling t Used	Well No. MIW Client E6-16 Project Case No. LOCATI		
levat ate	Time	Total Organics (ppm)	Measuring		Water Surface Elevation	Total Well	<u> </u>	Remarks		
OE -	1008	04		12' 37					RIAL	
			3 5.30	12,30	23.00					
										
-										
						i				
										
							· · · · · · · · · · · · · · · · · · ·			
	L									

Date I	nstalled Measu	D Little uring Poi	nt	Mo	Develope Measur Equation Recharant	ed ing and lipment	Well No. MW-Client EGG-Project Case No. LOCATI			
Date	Point (ppm) Point		Measuring Point	Depth To Water	Surface Well			Remarks		
7-6-70	1018	0.8		15'65"					RHL	
			3 5.49	15.54	19.95					
						1				

Arthur D Little Evacuation Method	Mon	itoring W Data	_	oling	Project Ami Case No. (0-2 G/USATHAMA 12-WATERTOWN 01453-50 CATION	
Sampling Method BASIER (LEVEL C) Sampling Personnel J.Fo.	RTNER,	Date 2 - / Equipment U HNu - PEO, Initial Well 1	PID (nnm)		#57 N		
C.MARTEL, S. FOSTE WELL VOLUME (* us V well .66 ANNULAR VOLUME	Se appropri Depth S x [(3	Screen Bottom 8.48	Depth Water 34.34	code letter)	c-2 allons of Water (well) 2.73	751	
V annulus 1.06 WATER TO BE REMO	x [(3	Screen Bottom 8.48 -	Depth Bottom of Ser 3 4.34		allons of Water (annulus) 4.38	Actual Callege	
Gallons of Wa (well) [(2.73		ons of Water (annulus) 4.39)]	Removal Multipier x 5 =	be Remo	ved	Actual Gallons Removed 35 Annulus *	
MEASUREMENTS Well Purging Time pH /6.08 6.49 /6.16 6.5	Conduct. 0.42 0.33	Temp. /5°C /5.6°C	Free CL ⁻ ON No	Dissolved Oxygen	Well V well 2" 0.17gal/ft	dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft	
1625 6.4 1632 5.5 Post Sampling	0.34	14.4°C 15.0°C	₩o ₩o		4" 0.66gal/ft 6" 1.5gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft	
SAMPLING Decontamination Procedures I Solvent Used Sample ID Analysis 7CC+30 YoL, CO-2 7CC+30 Sems CO-2 Cyansot Suiffol Suiffol Metals	Volume (ml) 40 /Gatton /L /L /L	Detergent Wash Solvent Rinse, Filtered (Y/N) No	Preservation HCL pN 42 LCE, NoON p. LCE, NoON p. LCE, HNO3 p. + 2n ALETA	N712 Poly N712 Poly N79 "	Detergent Wa Water Rinse Container	3x D.I. H ₂ O RINSE Time (3) 1705 1) 1705	
Notes (include data on floor Sample) SREATWING BONE OURLEATE SAMPLE Sigature	EN LEVE Exclusion Tomore	EON ZONE	10 5-20 WMS DE	PPM R FFSHEO. FOR 24	EADENG THIS WEL	L WILL BE	

Monitoring Well Sampling Well No. CO-3 Client EG+G/1/SATH An									
Λrthur D Little	INTOIL			ung		G/USATHAMA			
		Data	Sheet		Project Am	171-WATERTOW			
Evacuation Method		Doto			· ·	1453-50			
Pump (Suber	(+ 4 , 4)	Date	14-90		LOC Bunkers	CATION			
Sampling Method	32066)		Equipment Used (Calibrated ON)						
BATLER		1	TEMP/COND		14.4.4.3.3.2.2.3.3.3.3.3.3.3.3.3.3.3.3.3.	7 3/			
Sampling Personnel 7.1	DRINER	Initial Well	PID (nnm)			GUARD			
	PARTEL			leppm	1/49.35//	SOUTH CATE			
WELL VOLUME (*1	ise appropri	ate values in	table for each	code letter	·)	• .			
${f V}$ well	Depth	Screen Bottom	Depth Water	G	allons of Water (well)				
.66		33.07 -	7.73	□)]=□	16.7	1			
ANNULAR VOLUME	(ASSUM)	E 30% POR	ROSITY)			•			
V annulus			Depth	_	allons of Water				
1.06		Screen Bottom	Bottom of Sea	¹ □)]= □	(annulus)	1			
		-	7.73	<i>□ /</i>] = ∟	2017	l			
WATER TO BE REM Gallons of W		ons of Water	Removal	Total Gal	lons to	Actual Gallons			
(well)		(annulus)	<u>Multipier</u>	be Rem	oved	Removed			
[(16.7	+	26.9	x <u>5</u> =	218		220			
					Well	Annulus *			
MEASUREMENTS					V well	dia V annalus			
Well Purging			Free CL	Dissolved	B C	6.5 0.46gal/ft			
Time pH 	Conduct.	Temp.	No	Oxygen	2" 0.17gal/ft	7.25 0.59gal/ft 7.75 0.69gal/ft			
1030 6.59	0.85	13.0°C	No		_	8.25 0.79gal/ft			
1058 6.56	0.87	13.0°C	No	-					
1/27 6.53	0.88	12.9°C	No		4"	8.25 0.64gal/ft 10.25 1.06gal/ft			
1255 6.60 Post 22 maling 6.70	0.86	12.9°C	No		0.66gal/ft	12.25 1.63gal/ft			
Post Sampling 6.70			•		6"	12 25 1 41 - 1/64			
					─ 1.5gal/ft	12.25 1.41gal/ft			
SAMPLING						,			
Decontamination Procedures Solvent Used	Used	Detergent Wash			Detergent Wa	ash 🗹 Other			
Solvent Osea -		Solvent Rinse	, WaterRinse		Water Rinse	3×D.S.H ₂ O RINSE			
Sample ID Analysis	Volume (ml)	Filtered (Y/N)	Preservation	1	Container	Time			
Sample ID Analysis CO-3 CC1-30 YOLA,	40 ml	No	ICE HELDH		BEK GLHSS (
CO-3 706+3056mi.	1 GALLON		Ice, The		"(
CO-3 (YANEOL CO-3 SULFERF	12	No	Ice NOON		<u>YETYLEME</u> "				
SHEPTINE			ICE, NOON PA + ZN PLEIN						
CO-3 METALS	12	Yes	ICE, NNO, ph		",	1444			
Notes (include data on f									
FILLED 3 DRUMS	,								
ARRIVED. STOPPE	D Pump	PENG 1127,	RESUMED	PUMPS	THE 1255	COMPLETED			
PUMPENG 1322.	1 ==	, ,							
Sigature C 2	1. Z	<i>→</i>	Date 2-14	-90 No	o, of Bottles	コ			

Arthur D. C-Rolc

Well No. MW-0/									
	Mon	itoring ${f W}$	⁷ ell Samp	oling	Client £6+4	,	מנו		
Arthur D Little		Data S	Sheet		Project 📣				
					Case No. 6				
Evacuation Method Puml (SUBMERS)	-a, c)	Date 2.	8-90		ľ	CATION			
Sampling Method	825)	Equipment U		ted(VN)	<u>_</u>	8106. 3	9		
BATLER		HNW-PSD CON			مـــــــــ	MN-01	-		
	RIHER	Initial Well F	PID (ppm)	,		6	$\hat{\tau}$		
P. Co				0.5 ppm		FACON ST.	4200		
WELL VOLUME (* us	se appropri	ate values in ta	able for each	code letter))				
${f V}$ well	Depth	Screen Bottom	Depth Water		allons of Water				
.66		16.2 -	5.77	☐)]= [(well)				
ANNULAR VOLUME	(ACCTIM	F 20% DOD				·	<u>,</u>		
ANNULAR VOLUME	(ASSUM	E 30% FUR	Depth	G	allons of Water				
V annulus		Screen Bottom	Bottom of Sea		(annulus)	•			
1.06	x [(16.2 -	5.77)]= [11.05				
WATER TO BE REMO				Total Call	4-				
Gallons of Wa (well)		lons of Water (annulus)	Removal Multipier	Total Galle be Remo		Actual Gallo Removed			
[(6.9		//.05)]	x 5 =	= 89.7	75	90-9			
,					Well	Annulus	*		
MEASUREMENTS					Vwell	dia V an	nalus		
Well Purging			Free CL	Dissolved			gal/ft		
Time pH	Conduct.	Temp	ØŊ	Oxygen	2"	7.25 0.59	gal/ft		
1455 <u>6.0</u> 1520 6.0	1.89 2.40	10.0°C	<u> </u>		- 0.17gal/ft		gal/ft		
1530 6.0	2.38	10.0°C	- NO		-	8.25 0.79	gal/ft		
1546 6.0	2.3/	10.0°C	No	-	4"		gal/ft		
1603 6.0	2.28	10.0°C	No	-	0.66gal/ft		gal/ft		
Post Sampling						12.25 1.05	gal/ft		
					- 6" 1.5gal/ft	12.25 1.41	gal/ft		
SAMPLING					1.08.0.10				
Decontamination Procedures U	Ised 🔲	Detergent Wash	Water Pince		Detergent Wa	sch 🖂 o	ther		
Solvent Used		Solvent Rinse,			Water Rinse	3× D.J.			
	Volume	Filtered				RINSL	£		
Sample ID Analysis	(ml)	(Y/N)	Preservatio		Container	Time			
MW-0/ 761+30 VOL. MW-0/ 761+3056M2	16A110A	No	ICE, HULPH	12 Amo	genbungs (3 4 ll				
MW-0/ CYANEOE	11	No	ICE NOON	ONTR Par	ETNYLENE	<u> 1135</u> 1135			
MW-01 SULFEDE	12	No	206, NOON,		,,	1135			
		· 	+ ZN PLET						
MW-0/ METALS	12	YES_	Ico, HNO, A	N12 "	· ''				
Notes (include data on fl	oaters/sink	ers with measu	ıring device,	well condit	ion, etc.)				
WATER IS CLEAR									
	, ,	7 /	,	7					
Sigature	مهر . لدم		/2/ير Date	<i>90</i> No	. of Bottles _	7_			
	•		•						

Arder D Little

	<u> </u>				Well No	M . I - A O
	Mon	itoring W	lell Samn	ling	Well No.	
Λrthur D Little	IVIO	_	-	nng	Client £64	6 /USATHAMA
		Data S	Sheet		Project Am	TL-WATERSONN
	<u> </u>				Case No. 4	1453-50
Evacuation Method	,	Date				CATION
Pump (Susme	RSJELE)		8-90		/	1/2
Sampling Method			sed (Calibrat		<i>†</i>	19 1
BATLER		HAU-PED, P.	N PAPER, THER	MOM MAKE		
- 0	PRINER	Initial Well I	PID (nnm)	. Gppm	- 473 (2) (2) (2)	0-02-07
P. C						CON SIRECT
WELL VOLUME (* u	se appropri	iate values in t	able for each	code letter)	
${f V}$ well	Domalo	C D-44	TD 41 TW7 4	G	allons of Water	
· · · · · · · · · · · · · · · · · · ·	 -	Screen Bottom	Depth Water		(well)	7
.66] x [(16.42 -	8.84	<u> </u>	5]
ANNULAR VOLUME	(ASSUM	E 30% POR	OSITY)			
	•		Depth	G	allons of Water	
V annulus		Screen Bottom	Bottom of Sea		(annulus)	
1.06] x [(/	6.42 -	8.84	᠘)]= [_	8.02]
WATER TO BE REM	OVED					
Gallons of Wa	~ . ——	lons of Water	Removal	Total Gall		Actual Gallons
(well)		(annulus)	Multipier	be Remo	oved	Removed
[(5	+)]	x 5 =	65		265
					Well	Annulus *
MEASUREMENTS					Vwell	dia V annalus
Well Purging			Free CL	Dissolved		6.5 0.46gal/ft
Time pH	Conduct.	Temp.	$\mathbf{O}_{\mathbf{N}}$	Oxygen	2"	7.25 0.59gal/ft
1200 6.5	1.32	12.0°C	No		0.17gal/ft	7.75 0.69gal/ft
1220 6.0	1.54	12.0°C	No	-	_	8.25 0.79gal/ft
1240 6.0	1.6	13.0°C			_	0.4.1/2
1325 6.0	1.5	13.0°C		-	4"	8.25 0.64gal/ft 10.25 1.06gal/ft
					- 0.66gal/ft	12.25 1.63gal/ft
Post Sampling						1
					- 6" 1.5gal/ft	12.25 1.41gal/ft
CANDI INC					, riegas ii	
SAMPLING						-
Decontamination Procedures Solvent Used	Used	Detergent Wash			Detergent W Water Rinse	0
501,0110 5552		Solvent Rinse,	waterKinse		Water Kinse	3x D.I. HzO RINSE
	Volume	Filtered	Duaganyatio	_	Comtoinon	Time
Sample ID Analysis	40 ml	(Y/N)	Preservation	-	Container SEX GLASS (
MW-02 701.30 Sems	1 GALLON		Ic6	11		1) 1233
MW-02 CYANSOE	11	No	Ich, NOONA	H>12 POLY		1233
MW-02 SULFIDE	11	No	Ist Na ON ph		v	1233
			+ZNALETA			
MW-02 METAIS	12	YES	Ice HNO, p	Nez "	41	1233
	-				·	
Notes (include data on f	loaters/sink	ers with meas	uring device.	well condit	ion, etc.)	
THE WATER IS CLE			5 00 11009	J Voliali	, ••••,	
WE WHICK IS CLE	NK					
	, ,	, ,		,		
Sigature			,			
	Val. Lo	nt	Date <u>2/8/</u>	90 No	o. of Bottles	7_
Antion	y S. Lo	,	Date <u>2/8/</u>	90 No	o. of Bottles	7

					W	ell No.me	U - O3	3
A-thDi-Ho	Mon	iitoring V	Vell Sam	pling		lient & 6 • G		
Λrthur D Little		Data	Sheet			roject Ami		
					C	ase No. 6	1453	-50
Evacuation Method	<u> </u>	Date					ATION	
BATLER		, i	-12-90	_		* * * *	· 1	_
Sampling Method		Equipment U	Jsed (Calibr	ated 🏵	N)	05	1 22	,
BATLER		HNU-PID, P.	H/CONO. ME	TER		mw-03*	L	7
c. m	PRINCR PRIEL	Initial Well		0.5 p		Smoke STA		60
WELL VOLUME (* u	se appropri	iate values in t	table for eac	h code	letter)			
V well	Donth	Screen Bottom	Depth Wate			ns of Water		
.66	x [(21.88)]		(well)		
	· • ·			/	- L			
ANNULAR VOLUME	(ASSUM	E 30% POR	ROSITY)					
V annulus	Denth	Screen Bottom	Depth	٠ ١		ns of Water		
1.06	, , _	75.05 -	Bottom of S			nnulus)		
		-	27.00	/				
WATER TO BE REMO		lons of Water	Removal	Tot	tal Gallons	to	Actua	l Gallons
(well)		(annulus)	Multipier	b	e Removed	l		moved
[(2	+	3.3)	x 5	=	26.5		18	
						Well	An	nulus *
MEASUREMENTS						V well	dia	V annalus
Well Purging			Free CL	Dis	solved		6.5	0.46gal/ft
Time pH	Conduct.	Temp.	ØN		xygen	2"	7.25	0.40gal/ft 0.59gal/ft
<u>/053</u> <u>6.99</u>	2.18	Temp	_ No		-	0.17gal/ft	7.75	0.69gal/ft
1107 6.64	2.52	18.9°C	No				8.25	0.79gal/ft
<u> 1144 6.58</u>	2.69	17.9°C	No				8.25	0.64gal/ft
						4" 0.66gal/ft	10.25	
D. (C. 1)						0.00gavit	12.25	1.63gal/ft
Post Sampling						6"	10.05	d 4d -10
						1.5gal/ft	12.25	1.41gal/ft
SAMPLING								
Decontamination Procedures	Used \square	Detergent Wash	ı. Water Rinse	_	□ De	etergent Wa	sh	Other
Solvent Used —		Solvent Rinse		,		ater Rinse	3.2	0.5.420
	Volume	Filtered					,	Renst
Sample ID Analysis	(ml)	(Y/N)	Preservati			ntainer	_	Time
<u>MW-03</u> 761+30 Vol.	40 ml	No	Ice , HC/pH	<u> </u>	HMBEA	<u>(Gipss (3)</u> '' (1)		<u>823</u>
MW-03 CYANZOE	1 SAUGE	No No	Ice Na OH,	. N > 17		THYLENE		1 <u>823</u> 1823
MW-03 SULFIDE	11	No	Ice NaON		11	"		823
			+ ZNACE					
MW-03 METALS	12	YES	Ice, HNO,		,,	1,		1823
Notes (include data on fl	oaters/sink	ers with meas	uring device	. well c	ondition	Letc.)		
DUE TO REQUIR			_				e W85	JONY OF
GOING DRY AND TO	SAVE FER	TE THES M	ELL WAS	PURG	ED YEA	P P BP	ZLER	L1#268
PUMP WAS USED TO P BASIER SMELLED OF	CARAL MA	OP. WELL A	BASIENE	GLOV	es 8 ec.	MME ST	FCKY	440
	1 ~	// ~~~						
Sigature 🔾	Ind. No	~	Date	7-90	NO. 0	f Bottles	7	

Action D. Little

Λrthur D Little	Mon	Data	Vell Samp Sheet	ling	Project An	MW - 04 6/USATNAM 171-WATERTO 1453 - 50
Evacuation Method pump (SUBMENSIS Sampling Method BATLER		Equipment I	- 12-90 Used (Calibrat H/18mr/Cone		Smoke TL	CATION N
	ORTEL	Initial Well		0.6ppm	144-6470//	BIGANA
WELL VOLUME (* us V well	Depth S	ate values in 1 Screen Bottom 34.02 -	Depth Water		allons of Water (well)]
ANNULAR VOLUME V annulus	Depth S	E 30% POR Screen Bottom 24.02 -	OSITY) Depth Bottom of Seal		allons of Water (annulus)]
WATER TO BE REMO Gallons of Wat (well) [(er Galle	ons of Water annulus) 6.3	Removal Multipier	Total Gall be Remo	oved	Actual Gallons Removed
MEASUREMENTS					Well	Annulus *
Well Purging Time pH /038 6.87 /048 7.//	Conduct. 0.27	Temp. /9.2°C 24.7°C	Free CL - No No	Dissolved Oxygen	V well 2" 0.17gal/ft	dia V anna 6.5 0.46gal 7.25 0.59gal 7.75 0.69gal 8.25 0.79gal
7.30 1114 Post Sampling	0.20	25.0°C 24.9°C	No No		4" 0.66gal/ft	8.25 0.64gal 10.25 1.06gal 12.25 1.63gal
					6" - 1.5gal/ft	12.25 1.41gal
SAMPLING Decontamination Procedures U Solvent Used	Sed	Detergent Wash Solvent Rinse, Filtered			Detergent Wa Water Rinse	ash
Sample ID Analysis MW-04 7CL+30 for MW-04 7CL+30 SEM2 MW-04 CYANEDE MW-04 SULFEDE	(ml) 40mL 1 on con	(Y/N) No No No	Preservation Ice, HC/pH Ice, HaDN ph Ice, NaDN ph	17/2 Pot	Container ***EXG:4955 (3 *** (1) ***EINYLEHE***	Time () 1802 () 1802 (1802
MW-04 METALS	12	YES	Ice, NNO, ph	97E	//	1802
Notes (include data on flo Purseo Mw-03 w/ 8 SAMPLED TOMORRE	RNILER 5	IMULTANE	OUSLY. THE	S WELL 24 HOUR	WILL BO	e Duliscas

Arthur D Little Evacuation Method	•	itoring W Data S	Sheet	pling	Cl Pr	ell No. // lient £6+6 roject // mr ase No. /6	<u>/USA7</u> 12-Wa	NAMA TEATOWN • 5"O
Pump (Su8meRSE & Sampling Method BASLER	816)	Equipment U	1			814 1A	YKS H	7
Sampling Personnel J. Fo.	or tel	Initial Well F	PID (ppm)	0.60	m 4	[[]]]]]]]]]]] [[]][]]]]]]	11) k 5-0 ////	BANK BANK L
WELL VOLUME (* us V well 0.66	Depth:	Screen Bottom B. 39 -	Depth Wate		Gallo	ns of Water (well)		
ANNULAR VOLUME V annulus 1.06	Depth :	Screen Bottom 8.39 -	Depth Bottom of So	eal)]=	(a	ns of Water nnulus)		
WATER TO BE REMO Gallons of War (well)	ter Gall	ons of Water (annulus) (D. 3	Removal Multipier x 5	be	I Gallons Removed			l Gallons noved
MEASUREMENTS		· · · · · · · · · · · · · · · · · · ·				Well		nulus *
Well Purging Time pH /200 5.24 /223 Veu Ra		Temp. 9.6 C	Free CL ⁻ VN No CUANCE	Ox	olved ygen	V well 2" 0.17gal/ft	dia 6.5 7.25 7.75 8.25	V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft
1240 5.58 1244 Well Ro. Post Sampling	0.39 N DRY, A	<u>8.9°C</u> EN <u>O PUMP</u> :	<u>Nb</u> ING	•	-	4" 0.66gal/ft	8.25 10.25 12.25	0.64gal/ft 1.06gal/ft 1.63gal/ft
						6" 1.5gal/ft	12.25	1.41gal/ft
SAMPLING Decontamination Procedures Used Sample ID MN-05 MN-0	Volume (ml) YOML /GRICON /L /L Oaters/sink	Yes ers with measu	Preservation of the preser	on V=2 N>12 N>9 OF E N=2	Co Res 64 " Pory 65	•	3x 0	Other S. N. O NSE Time 735 735 735 735
Sigature	J. To	£	Date <u>2-/3</u>	1-90	No. of	f Bottles _	7	

Ardur D Lide

Λrthur D Little	Mon	itoring W Data	Vell Samp Sheet	ling		USPTHAMA TL-DATERIOUN
,	RINER	Equipment U	/4-90 Jsed (Calibrate #/ <i>15mp/covo</i> PID (ppm)		SUNKERS LOC A A A A A A A A A A A A A A A A A A A	
WELL VOLUME (* us V well O.66 ANNULAR VOLUME V annulus	Depth S	Screen Bottom	Depth Water 6.87 COSITY) Depth	code letter; Ga	allons of Water (well) 5.5 allons of Water	
WATER TO BE REMO Gallons of Wat (well) [(5.5	x [(/	ons of Water	Removal Multipier x 5 =	Total Gallebe Remo	ved	Actual Gallons Removed
MEASUREMENTS Well Purging Time pH /334 5.94 /357 5.26	Conduct. 2.17 2.48	Temp. 10.9°C 11.8°C	Free CL ⁻	Dissolved Oxygen	Well V well 2" 0.17gal/ft	Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
1420 5.47	2.45				4" 0.66gal/ft 6" 1.5gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used Solvent Used Sample ID Analysis MW-06 7C1+30 You MW-06 7C1+30 Sems MW-06 CYANEOE MW-06 METALS	Volume (ml) 40 ml / contact	Detergent Wash Solvent Rinse, Filtered (Y/N) No		1712 <u>Poly</u> 1772 <u>Poly</u> 179 "	Detergent Wa Water Rinse Container Contain	3x D.I. H ₂ O Rews£ Time 1454
Notes (include data on fle	,	- 	uring device, v		ion, etc.)	7

Arthur D Little	Mon	itoring W Data S	/ell Sampl Sheet	ling	C Pi	'ell No. / lient Æ6+6 roject <i>ami</i> ase No. /	/USA 2-Wa	7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.7.
Evacuation Method PUMP (SUBMERSIBE Sampling Method BATLER Sampling Personnel J. FOR P. COR	TWER	Equipment U HNu-PEO po Initial Well I	D .	169. <u>, Tuba</u> loppm	4	LOC		N N P ROUND
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth S	Screen Bottom	Depth Water])]= [Gallo 	ns of Water (well)		
V annulus /.06 WATER TO BE REMO Gallons of Wat (well)	x [(Call	ons of Water	Bottom of Seal 29. / 7 Removal Multipier	Total Ga	8.		Re	ıl Gallons moved
[(5.08 MEASUREMENTS Well Purging	Conduct. 0.22 0.24	Temp	Free CL ON	Dissolve Oxyger		Well V well 2" 0.17gal/ft		nulus * V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft
1555 6 1615 7 Post Sampling	0.30	15° C	No No			4" 0.66gal/ft 6" 1.5gal/ft	8.25 10.25 12.25	0.64gal/ft 1.06gal/ft 1.63gal/ft 1.41gal/ft
SAMPLING Decontamination Procedures U Solvent Used Sample ID Analysis 761-30 Vol MW-07 761-30 Seme	Volume (ml) 40 mL	Detergent Wash Solvent Rinse, Filtered (Y/N)			W: Co	etergent Wa ater Rinse ontainer	3× 1 8	Other O. J. H. 20 Other O. J. H. 20 Other
MW-07 CYANIOE MW-07 SULFERE MW-07 METALS	L	No No Yes	ILC, NA ON P N ILC, NA ON P N + ZWA 167A; ICG, HNO, PA	>12 Pos	YE7.	NYIENE ''		700
Notes (include data on flo	oaters/sink	/	uring device, w			f Bottles	7	

O. 66 x [([ANNULAR VOLUME (ASS)	Equipment How PSD Initial Well Propriate values in Propriate valu	Depth Wate - 32.5/ ROSITY) Depth Bottom of Se - 32.5/ Removal Multipier x 5	code letter	Gallons of Water (well) Gallons of Water (annulus) Bloos to coved Well V well	Actual Gallons Removed 65 Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
WELL VOLUME (* use appr V well O.66 X [([ANNULAR VOLUME (ASSI V annulus I.00 X [([WATER TO BE REMOVED Gallons of Water (well) [(5 + MEASUREMENTS Well Purging Time O909 6.77 O9/6 6.77 O9/6 6.44 O.27 O930 6.5/ 0.42 O937 Post Sampling SAMPLING Decontamination Procedures Used Solvent Used	copriate values in Pepth Screen Bottom 40.03 UME 30% PO Pepth Screen Bottom 40.03 Gallons of Water (annulus) 8 Ct. Temp. /3.6°C /4.6°C	Depth Wate - 32.5/ ROSITY) Depth Bottom of Se - 32.5/ Removal Multipier x 5	r	Gallons of Water (well) S Gallons of Water (annulus) Well Vwell d 2"	Actual Gallons Removed 65 Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
O.66 x [(ANNULAR VOLUME (ASS) V annulus D.	#0.03 UME 30% PO Pepth Screen Bottom #0.03 Gallons of Water (annulus) B Ct. Temp. /3.6°C /4.6°C	ROSITY) Depth Bottom of Sc. 32.5/ Removal Multipier S Tree CL	Total Gabe Rem	(well) 5 Gallons of Water (annulus) 8 Bloos to noved Well V well d 2"	Actual Gallons Removed 65 Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
	Gallons of Water (annulus) B Ct. Temp. /3.6 C	Removal Multipier Free CL	Total Ga be Rem Dissolve	(annulus) B Illons to noved Well V well d 2"	Actual Gallons Removed S Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
Gallons of Water (well)	(annulus) B ct. Temp. /3.6°C	Free CL	be Rem	Well V well d	Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
Time	13.6°C	ON No No		V well	dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft
Decontamination Procedures Used Solvent Used		No No	-	4" 0.66gal/ft	8.25 0.79gal/ft 8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft
Volu		sh, Water Rinse,		1.5gal/ft Detergent W Water Rinse	12.25 1.41gal/ft (ash Other
Sample ID Analysis (ml MW-08 7CL+30 Vol. 40 ml MW-08 7CL+30 Vol. 40 ml MW-08 CYRNSOF /L MW-08 SHLFEOF /L	Filtered (Y/N) No No No No	Preservation Ice NCI ph Ice NaON p Ice NaON p Ice NaON p	H > R Pos N > P Pos	Container SEAGLASS (3 SEAGLASS (3 VETNYLEMEA •	Time // 1920 // 1920
Notes (include data on floaters/s	sinkers with mea	suring device,		tion, etc.)	

Λrthur D Little	Mon	itoring V Data	Vell Sam Sheet	pling	Project am.	MW - 10 5 / USATN APAA TL-WATEATOUN 61453-50
Evacuation Method Pump (Susmers181 Sampling Method	ee)	Date 2 Equipment	- <i>8 - 90</i> Used (Calibr	ated(V/N)	ARSONAL ST.	CATION 7"
BATIER		HN4-950, P.	MARKA COM		36 / / / 1	W-10 PARNING
Sampling Personnel A. For P. Co.	VA	Initial Well		0.6pm		(11)1/1/1/1/
WELL VOLUME (* us	e appropri	ate values in	table for eac		allons of Water	
V well 0.66		Screen Bottom	Depth Wate		(well) 3.58	
ANNULAR VOLUME	(ASSUM)	E 30% POF	ROSITY) Depth	G	allons of Water	
V annulus		Screen Bottom	Bottom of S	-	(annulus)]
WATER TO BE REMO Gallons of Wat (well)	ter Gall	ons of Water (annulus)	Removal <u>Multipier</u>	Total Gall	oved	Actual Gallons Removed
[(3.58	+	5.75] x _ 5 _	= 46.7		Annulus *
MEASUREMENTS					Well V well	dia V annalus
Well Purging Time pH /725 6	Conduct. 0.40	Temp	Free CL -	Dissolved Oxygen	2" 0.17gal/ft	6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
1830 6	0.52	/3	No	-	4" 0.66gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft
Post Sampling					6" 1.5gal/ft	12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used Solvent Used Sample ID MW-/O MW-/O MW-/O MW-/O MW-/O MW-/O SULFIDE SAMPLING Analysis 7(1+30 You 7(1+30 Simf MW-/O SULFIDE	Volume (ml)	Filtered (Y/N)	Preservat TCE, HCI	ion <u>0H'2 Ama</u> " N _O H'>12 <u>Poe</u> N _O N'>9 ''	"(,)	3x D.I.H2O Rews& Time
mw-10 meras	12	Yes	Ico, HNO3	pH 12 11	"	1100
Notes (include data on flagger as RUSTY. W. RECOVERY, BEGAN PURE	ATER BE	GAN CLEAR	11NG 173	33 weu pry e 18.	RAN DRY	7

Λrthur D Little	Mon	_	Well Samp Sheet	ling	Cl Pr	ell No. / ient <i>£6-16</i> roject <i>Am)</i> ase No. /	/45A	WANA
Evacuation Method Pump (Submers Sampling Method	5181E)		'-/ 3-90 Used (Calibrat	ed(V)			ATION	
BATLER Sampling Personnel 7.1	ORINER IARIEL	HNG-PED, A	PID (nnm)		<u>a</u> 6	MY SERT R	X M FF H	JGGC-3
WELL VOLUME (* us V well	Depth S	Screen Bottom	Depth Water	code le	Gallo	ns of Water (well)		
ANNULAR VOLUME V annulus	Depth S	E 30% PO	ROSITY) Depth Bottom of Sea 4.29	ı <u>ı</u>)]=	(a	ns of Water nnulus)		
WATER TO BE REMO Gallons of Wate (well)	ter Gall	ons of Water annulus)	Removal Multipier x 5 =	be	l Gallons Removed		-	l Gallons moved
MEASUREMENTS Well Purging Time pH /530 5, 4/ /6/2 5.45	Conduct. (.05 0.40	Temp. 9.9 °C /2.6 °C	Free CL ⁻ ON No	Ox	olved ygen	Well V well 2" 0.17gal/ft	An dia 6.5 7.25 7.75 8.25	Nulus * V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft
Post Sampling						4" 0.66gal/ft 6" 1.5gal/ft	12.25	0.64gal/ft 1.06gal/ft 1.63gal/ft 1.41gal/ft
SAMPLING Decontamination Procedures Used	Volume	Solvent Rins Filtered	sh, Water Rinse, se, WaterRinse		Wa	tergent Wa ater Rinse	3x 0.	Other Z. N20
Sample ID Analysis	10ml 10ml 1L 1L	No No No No	Preservatio ICE, NCI pN . ICE, NGON p. ICE, NGON p. ICE, NGON p. * ZwALETA	N7/2 N7/2 N79	Amged "	ntainer 6: <i>wss (3)</i> " (') YCENE		Time 735 735 735 735
MW·II METALS	12	YES	Ice, HNO, p	H•2	"	11		735
Notes (include data on flowers)				well co	ondition	, etc.)		

Arthur D Little	Mon	itoring W Data S	Vell Sampli Sheet	ing	Well No. A Client 26+6 Project Am. Case No. A	/USATA 52-Na	VARADA TERTONIN
Evacuation Method Pump (Submersa Sampling Method	1816)	Equipment U	12-90 Jsed (Calibrated	1 (2) N)	LOC	CATION	
	ARTEL	Initial Well 1		5ppm	0-2	CO-2	n⊷-12
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth S	Screen Bottom	Depth Water	G:)]=	allons of Water (well) 3.7		
V annulus 1.06 WATER TO BE REMO	x [(3	7.33 -	Bottom of Seal 31.69)]= [(annulus)		
Gallons of Wat (well)	ter Galle	ons of Water annulus)	Removal Multipier x = [Total Gallo be Remo	ved		Gallons noved
MEASUREMENTS Well Purging Time /425 6.32 /433 6.07 /442 6.18 /455 6.25	Conduct. 0.43 0.33 0.32 0.32	Temp	Free CL ⁻ N No No No	Dissolved Oxygen	Well V well 2" 0.17gal/ft 4" 0.66gal/ft	dia 6.5 7.25 7.75 8.25 8.25 10.25	V annalus V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft 1.064gal/ft
Post Sampling					6" - 1.5gal/ft		1.63gal/ft 1.41gal/ft
SAMPLING Decontamination Procedures Used Sample ID MW-/2 MW-/	Volume (ml) 40ml /enclow	Detergent Wash Solvent Rinse, Filtered (Y/N) No No Yes	Preservation Ice, NCIPNE Ice, NaDNAN Ice, NaDNAN Ice, NaDNAN IENACETAT	2 And 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Detergent Wa Water Rinse Container ************************************	3× 0 Rs 2 2 2	Other I. H2O : MSE Fime 000 000 000
Sigature	J. Jon	<u> </u>	Date <u>2-/2-</u> 9	90 No.	of Bottles	7	_

Ardor D Little

Λrthur D Little	Mon	itoring W Data S	_	ling	Project An	MW - 13 6/USATHAMA 171-WOTEATOWN 61453-50
Evacuation Method pump (Submersz Sampling Method BASLER Sampling Personnel J. For	RTHER	Equipment U	9-90 Ised (Calibrate PID (ppm)		ARSEN HE	CATION 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
WELL VOLUME (* us V well O.66 ANNULAR VOLUME V annulus	Depth S x [(2 (ASSUM)	Screen Bottom	Depth Water	code letter]
WATER TO BE REMO Gallons of Wa (well) [(5.89	ter Gall	ons of Water (annulus)	Removal Multipier x 5 =	Total Galbe Rem	oved	Actual Gallons Removed
MEASUREMENTS Well Purging Time pH 0845 5.5 090/ 5.5	Conduct. 0.28 2.08	Temp	Free CL - ON No	Dissolve Oxygen		Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
09/0 6.5 Post Sampling	3.05	14.0°C			4" 0.66gal/ft 6" 1.5gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used	Used Volume	Detergent Wash Solvent Rinse, Filtered			Detergent W Water Rinse	ash Other 3× D.I. H ₂ O RENSE
Sample ID	HOME HOME	(Y/N) No No No	Preservation Ich, HCl, plan Ich, Hall plan Ich, Hall plan Ich, Hall plan + 2-Ach	17/12 Por 17/12 Por 17/19 "	Container MAGENTIEN (3) YETHYLENCE	
Notes (include data on fl Water was energy			Ico, NNO, of	vell condi		1120
Signture	17	,	Date 2 0 -6		o of Rottles	·

Arthur D Little Evacuation Method Pump (Submer Sampling Method		Data Sheet Date 2-9-90 Equipment Used (Calibrated N)			Well No. MW-14 Client E6+6 / USATHAMA Project AMT1-WATEATOWN Case No. 61453-50 LOCATION ARSENDI ST.			
BATLER Sampling Personnel J. For	27 N.F. O	HWu-PEO, PH Initial Well I	PAPER, CON	BLO	6. # 311			
P. Co	HN			0.8 ppm	mw-14			
WELL VOLUME (* us V well		ate values in to Screen Bottom	able for each Depth Wate	Ga	illons of Water (well)			
0.66		4.25 -	15.43)]= [5.82			
V annulus	Depth:	E 30% POR Screen Bottom 24.25 -	Depth Bottom of S	eal	allons of Water (annulus) 9.35	Actual Gallons		
Gallons of Wa (well) [(5. B2		ons of water (annulus) 9.35	Removal Multipier x	be Remo	ved	Removed		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<u> </u>		Well	Annulus *		
MEASUREMENTS Well Purging Time pH /040 6	Conduct. 0.58	Temp. /5 °C	Free CL	Dissolved Oxygen	V well 2" 0.17gal/ft	dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft		
	0.62	19.5°C	No No		4" 0.66gal/ft	8.25 0.64gal/fd 10.25 1.06gal/fd 12.25 1.63gal/fd		
					6" - 1.5gal/ft	12.25 1.41gal/ft		
SAMPLING Decontamination Procedures I Solvent Used Sample ID Analysis 7C/+30 You, MW-14 TC/+30 You, MW-14 EYANTOE MW-14 Surfeace MW-14 METALS Notes (include data on fl	Volume (ml) /GALLON /L /L /L oaters/sink	YES ers with measi	Preservati Ich, HClps Ich, HClps Ich, Holm Ich Noon Teh, NNOon Iring device	on	Container PA GENSS (3) VETNYLEME " on, etc.)	3x D.I. H ₂ O RIMSE Time /450 /450 /450 /450		
WATER WAS CLOUDS RAW DRY, BUT PE WATER SEEMED VE Sigature	IMPED Y	I.Y. SLOW , AM, MUST	FENESH	PURGIN R STEAM	'G AFTER	3 HOURS,		

Λrthur D Little			oil Sample Log	Client EG+G Idaho Project AMTL - KATESTEAN Case No. 61453 Date Edwards 1910
Sampling N	Method HAILS A	<i>যুক্≅</i> ≳ Eq	uipment Used	LOCATION
Geologist(s	•	c.	STAINLESS STEEL BARREL-TY LUGGER (3%)	AC .
500	or fister		Auger (3°)	
		es Trenh A	wood housel for will the	
	DEGANIC ALM • SAMPLE COMPLE	alysis Isites for	ugen branel for volatile Semivols, 1985, Metals, Cyanide	3.
Sample Number	Auger Hole ID	Total	GEOLOGIC DI Unified Soil Class ID, color sorting, moisture, compactio	
Olseloi Oisacoi Dor	Olsolol Disolol Duplic	ATO	felders (up to 1" diking),	AND (OL) with Minorden, Color 54R 2/2
0250L01	0250201		metal shop floor claise, wood, city grime - a RAB	is including METAL FILINGS TEXTS
CB solon	0350401		DARK BROWN (5 YR 2/2) STONE FILL 1-4" BLACK- 4-6" - NO Edge & REFINA	GRAVELLY SAND WITH ARA COROUN CITY ARMULISANT OF
06:5eL01	0650201		Thick upparticity the MATT TYREYD DRYANIC RICH LOAM & SAND WITH 5% PERPORT !!	TO 1", 1-4" DARK BIXWN - 4-6" OLUR BRAY YRAWIY
élésebel	06suboi		BROWN (5 YR 2/2) URJANIC A GRAY/BROWN /BLACK SANDY MATE 13 " (3 w), ABUNDANT PEINC	ICH SANTY TOA SOIL TO 2"
oeschel bupliete	OGSCBOI DUPLICATE		"DAME AS Above	·
0950L01	5980601		30-40%, pelite Fill MATEN with clive gray To TAN SAMO, O'L LEAKS FROM TRANSTOR	VAL PROXIMAL TO TRANSFORMER MATIETK, HISTORY OF HERE
0950Loa	09501.02		30-40% pebbles with controlly sand THANGERMER, GRAVEL/SAND (548-4/4-548-4), No INDI	MATRIX TAN TO KEN GOWN
(Zscher	1250her		0-6" DEARLY ORGANIC RYCH MARRIAL, 6-15" FOORLY GRANCO TO WYR Cho - PROPLY GRANCO	(MARK DROWN (5 YE 2/2) (MANSILLAND COT) 5YR4/4 (LARAREL TE 88"
13 Soloi	13 Sol 01		TAN TO CHIVE LIBORUM (5) A/4 FROM 3-6" (GP), ORYANIC SIZN OF CONTAMINATION) poorly graped GAND/gravel Rich Top for 0-3" - No
14 scho1	14-50601		Unitary poorly granuel pro Surface to re"-dark brown Metallic objects incl. Nails	N (5 YR 2/2) - KXIBIBOL(
14 subsag	14 suboa		1-6" tebbly strilly soil, a (et) w/ 10-15/ pebbles of Precent Oxidored letal for Cryptic Rich Top Sell (5 yrs)	6-18" KANNY NOWHY MOTERALL
15%lei	15 36 01		- B-E- CULL TARBEANCHY SAUD C	we cheandistect cont. (2075)
(5 to E 42	75 BOL OB		FREELY GRANDEL GENELL GARLE	RIS 76", NU COCKE > (OP) WITH LUSICK FRANKENTS DREWN 540-974, CA SURGU

Soil Sample Log Continuation Page

Client EG+ G Idaho
Project AHTL-UNTERTOOL
Case No. 61453
Date Ehenry 1990

Sample Number Auger Hole ID Total Organics (ppm) Total Organics (ppm) Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description DN ORDER A/4) ORGANIC AND CLAY CICH TO SOIC				Date February 1990
17 Sub 01 To 6", 6-12" JEADES FROM DAIR DECEMBER STRAY (4A) PRODUCT JEADED STREET JEADED WITH NIGHT OR AND 17 Sub 02 17 Sub 03 17 Sub 04 17 Sub 04 17 Sub 04 17 Sub 05 17 Sub 06 17 Sub 07 17 Sub 06 17 Sub 07		Auger Hole II	Organics	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 03 17 50 00 18 00	1750601	1730601		TO G"; G-12", APADES FROM CHARK DEDUCT TO OLIVE SPAY (GM) POUND STRADED STATES SAND WY MINDE UNCOMBUSTED COAL
17 50 03 OLIVE OPENING (575/2) SILT (ML) WITH & 2/ perholes, SAMPLE POINT ~ 50" FROM PRIZE COLDE. ORGANIK RICH MATT O-2" (5 YR 2/2) WITH INDEPNIE 17 50 LOI 17 50 LOI FINE SAND/SILT MIXTURE (ML) (5 Y 4/4) WITH SLIGHT PLASTICITY FROM 2-6" CONDUCTS OF TO 3-4" D'AMETER 1-3" DACK DECON SANDY, REDLY COAM WITH Nigh CREMENT	1750b og.	17 sub 02		1-6" poorly sorted gravelly sand with high organic CONTENT, 6-12" gray-Tan Acordy graded Sandy gravel with Uncombusted coal, 12-15" poorly-graded black Grown-Amiel
17 Sel 01 17 Sel 01 17 Sel 01 17 Sel 01 17 Sel 02 17 Sel 02 17 Sel 03 18 Sel 03 18 Sel 04 Marter (ML) (Syyara) with a light organizer (Southern Sell) (Sell) (Sell	17 oub 03	17 dub 03	}	POINT & SO FORM ROBE COLD.
17 Sel CR 17 Sel CR 1-3-c" medium gr. well popular airth high cagmin content, 3-c" medium gr. well popular airth (5 5) with 21 popular (5 7 R 3 A) - No CONTENTION TION	17 5cl oi	1750601		ORGANIC RICH MATT 0-2" (5 YE 2/2) WITH INDEPENCE FINE SAME /SILT MIXTURE (ML) (5 Y 4/4) WITH SLIGHT PHOTICITY FROM 2-6", CONNECS OF TO 3-4" DIAMPTER
	175cL02	17 sil 02		1-3" dack beown SANLY, peolety coam with high cognition CONTENT, 3-6" medium growell granded sand (50) with 24 peobles (5 YR 323) - No CONTAMPATION

Date	2-15-90
Client,	EG+G /USATHAMA
Project	AMIL-WATERTOWN
Casa	0 1115

	Case No. 6/453-50				
TANK / SUMP DESCRIPTION					
Sampling Access Description DPEN LED OF CLESIERN, H.O LEVEL @ TOP	DIPPED CONTAINER				
Leak Detection / Monitoring Present (Describe) None	,				
Tank) Sump Dimensions (LxWxH) 30'x 50' * 10' A 1	fe. 2 % Full _100 %				
Tank Sump Status: Active Inactive Date Installe	d Age				
Type Of Construction STEEL AND CONCRETE					
Content History Contraga REALTOR COOLENG WATER					
HEALTH and SAFETY MONITORING					
Equipment Used (Calibrated Y/N) None CHEMICAL RADIATION P.	ADIECTIVE GLOVES				
Time Reading	Time Reading				
Air Quality Readings Pre-Sampling					
During Sampling					
During Sampling					
SAMPLING PROCEDURE					
Equipment Used (Calibrated Y/N) CHEMICAN (RADIATION RESISTANT D	SIDVES. do LOUISONINE				
Decontamination Procedures Used	TOTOS. NO EQUIPMENT				
Detergent Wash Solvent Rinse Detergent Wash	ash Other				
Water Rinse Water Rinse Water Rinse					
Solvent Rinse Water Rinse					
Solvent Used					
SAMPLING VOLUME FILTERED	ANALYSES				
	OTHER TIME				
AGAQUOI DEPPENG 16AUON NO HNO PH-2 1	RAO SAMPLE 1515				
Y OCCUPATION DATA CRAIM CONTROL					
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling loca	ations, discharge / fill points)				
BLDG. VIII RENCIOR					
# \\//\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
97					
DOOR OF REACTOR					
CISTLAN					
ROAD					
Signature Date 2-15-90 No. O	f Rottles /				
Date 2-73 - 70 140. U					
V	Page/_ of/_				

Date	2-1	15.9	90	
			ATHAM.	4
Projec	t am	72 - h	JAVERTO	مدا
			9	

		Case No. 61453-50			
TANK / SUMP DESCI					
Sampling Access Description Remove RECTANGULAR STORM SEWER GRATE					
Leak Detection / Monitori	ng Present (Describe) <u>Nos Assescasec (N.</u>	A.)			
	(LxWxH) <u>See MAP</u> Total Volume <u>N.A</u>				
	ve Inactive Date Installe	ed Age			
• -	BRICK AND CONCRETE				
Content History Store	M SEWER (SURFACE RUNOFF).				
HEALTH and SAFET	Y MONITORING				
Equipment Used (Calibrat	ed Y/N) None				
-	Time Reading	Time Reading			
	Pre-Sampling During Sampling				
]	During Sampling				
	During Sampling				
SAMPLING PROCED					
	ed YN / DIPPER W/ CHEMICAL RESES.	TANT GLOVES			
Decontamination Procedu		\ \times \qquad \qq \qu			
Detergent Wash Water Rinse	Solvent Rinse Detergent W Water Rinse Water Rinse				
Solvent Rinse		DEDICATED DIP			
Water Rinse		CUP			
Solvent Used					
SAMPLING	VOLUME FILTERED	ANALYSES			
SAMPLE METHOD	(ml) (Y/N) PRESERV.	OTHER TIME			
OISEDOL 259/SCRAPE		101+30 Voc. 1555			
11 11 11 11	_	TCL + 30 SEME1PEB 1555 CVANCUE 1555			
11 11 11 11		Meiaustrum. 1555			
LOCATION DIAGRAM	M and NOTES (Indicate orientation, sampling loca	ations, discharge / fill_points)			
ARSENAL ST.		points)			
**************************************	*/}///*/	\vee			
1/9 mw-10	N W	\wedge			
\$ /// <u>/</u>		# 4.0' DEAMETER			
246	24 Deep	C BASE OF			
0156	1001	<i>34****</i> .			
*////		7.			
* ////////////////////////////////////					
Signature	1. Jan Date 2 -15-90 No. 0	of Bottles			
1		Page _ /_ of _ /			

Date	2-15-90
Client	E6+6/USATHAMA
Projec	et MMTL-WATERTOWN
	Y _

	Data Silect	C N			
		Case No. 61453-50			
TANK / SUMP DESCI					
Sampling Access Descripti	ON REMOVE ROUNDED STORM SEWER GRA	97E			
Leak Detection / Monitori	ng Present (Describe) Nos Applicable (N.A.))			
	(LxWxH) Total Volume /A.)				
Tank Sump Status: Acti	ve Inactive Date Installe	d Age			
	BRICK AND CONCRETE				
Content History STOP	AM SEWER SURFACE RUN-OFF				
HEALTH and SAFET	Y MONITORING				
Equipment Used (Calibrat					
Equipment Osca (Canbrat	Time Reading	Time Reading			
	Pre-Sampling				
	During Sampling				
	During Sampling				
	Post-Sampling				
SAMPLING PROCED	URE				
Equipment Used (Calibrat	ted Y/N) <u>Usio A DIPPER SCRAPPER BUC</u> res Used GLOVES. FF	KET AND CHEM. RESISTANT			
Decontamination Procedu	res Used GLOVES.				
Detergent Wash	Solvent Rinse Detergent Wa	ash Other			
Water Rinse	Water Rinse Water Rinse				
Solvent Rinse Water Rinse		DEDICATED SCRAPE BUCKET			
		Jenn's Gasie			
Solvent Used					
SAMPLING	VOLUME FILTERED	ANALYSES			
SAMPLE METHOD	(ml) (Y/N) PRESERV.	TIME			
095LGOI DIP/SCRAPE		CL130 VOL. 1635			
<u>" " " " " " " " " " " " " " " " " " " </u>	1l No Ict 7	1635 - 16			
s, // « 1/	250 ml No Ice	CYANEUE 1635			
<i>,, </i>	500 ml No Ict	METALS /TOL 1635			
LOCATION DIAGRA	M and NOTES (Indicate orientation, sampling loca	stions discharge / fill points)			
EGEATION BIAGNA	and 140 1125 (indicate of rentation, sampling loca	tions, discharge / fin points)			
	MAIN GATE	~ I			
BLOG. # 43		7			
09516013					
8106#313					
Signature Date 2/15/96 No. Of Bottles 6					

Date	2-	15	-90	
Client	EG+6	/115	ATHAM	0
Projec	t am	72 · L	PATERION	1
			-2-CD	

Case No. 61453-50						
TANK / SUMP DESCRIPTION						
Sampling Access Description Remove CERCULAR GRASE (MANHOLE).						
Leak Detection / Monitoring Present (Describe) Nor Applicable (N.A.)						
Tank Sump Dimensions (LxWxH) Set Map Total Volume N.A. % Full Sinnverture						
Tank /Sump Status: Active Inactive Date Installed Age						
Type Of Construction BRICK AND CEMENT						
Content History Storm Sawer AND SURFACE RUN-OFF						
HEALTH and SAFETY MONITORING						
Equipment Used (Calibrated Y/N) Not Applicable						
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling						
During SamplingPost-Sampling						
SAMPLING PROCEDURE						
Equipment Used (Calibrated Y/N) DEPPER BUCKET AND CHEM. RESESTANT GLOVES						
Decontamination Procedures Used						
Detergent Wash Solvent Rinse Detergent Wash Other						
Water Rinse Water Rinse Water Rinse DEDICATED						
Water Rinse Bucket.						
Solvent Used						
SAMPLING VOLUME ENTERED Avances						
VOLUME FILTERED ANALYSES SAMPLE METHOD (ml) (Y/N) PRESERV. CHIER TIME						
125601 DIP/SCRAPE 4D mal(13) No ICE 701+30 VOL 1615						
" " " 1l No ICE TCL+30 SEME, 1615 + PCB						
" " 250 ml No ICE CYANEDE 1615						
" " 500 ml No ICE METALS/TCL 1615						
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)						
• SOTHER MANHOLES BLOG. # 60						
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
1251401						
Ja Han Gumester						
11/1// 30 1/17						
LARGE OSL TANKS						
Signature Date 2/15/40 No. Of Bottles 6						

	Date 2-20-90
	Client EG+G/USAIHAMA
ļ	Project AMIL-WAIGATOWN
	Casa No

				Case No.	61453-50	
TANK / SUMP DESCI	RIPTION	ENTER THROU	GH STORM CEL	UAR DOORS O	N S.W. CORNER,	
Sampling Access Description FOLLOW ACCESS WAY TO 15 LEFT, CROSS PIPES, SUMP JUST AS YOULROSS PRIES.						
Leak Detection / Monitoria	ng Present (Descr	ribe) <i>Nor AP</i>	PLICABLE /N.A	<u>(,)</u>		
Tank / Sump Dimensions					ıll <u>/0 %</u>	
Tank / Sump Status: Activ	ve 🗸 Inac	ctive	Date Insta	ılled	Age	
Type Of Construction						
Content History Busion	ING #39 SUM	P.				
HEALTH and SAFETY	MONITOR	ING				
Equipment Used (Calibrat	ed Y/N)	APPLICABLE				
	Pre-Sampling	Time	Reading	Time	Reading	
]	During Sampling					
	Ouring Sampling _ Ouring Sampling	 -				
	Post-Sampling _					
SAMPLING PROCED	URE					
Equipment Used (Calibrat		PED SUIGE N	CLOVED NAND	AND GLASS	BERKER	
Decontamination Procedu						
Detergent Wash		ent Rinse	Detergent		Other	
Water Rinse Solvent Rinse	└── Wat	ter Rinse	Water Ri		I. WATER	
Water Rinse					use	
Solvent Used						
SAMPLING		·				
SAMPLE METHOD	VOLUME (ml)	FILTERED (Y/N)	PRESERV.	ANALYSES TITTER	TIME	
OSSIGOZ GLASS BEAKER			ICE	166.30 Voc.	1530	
17 1/ 11 11	11	No	Ich	TC1+30 SLM2+	1530	
<i>ji ij</i> 11 17	250 ml	-/-	Ice	CIANZOE	1530	
11 11 H	500 ml	No	Ict	METAIS/ICL	1530	
LOCATION DIAGRAM	M and NOTES	S (Indicate orie	ntation, sampling l	ocations, dischar	ge / fill_points)	
_				ch' i		
	- 0551603	N	(K-	20	-> /	
0]	1				
STORM DOORS	7	1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	*		
	0551601	PIPES Y	OU HAVE R	/3 °		
BLDG. #39	1	TO CRO	ss. \ -	NOT SAMPLED -	/	
			J	055LG01 {	URI	
				0332007		
Signature	fat-	Date	2/20/90 No.	Of Bottles	6	

Date	2-20	-90	
Client	16.6/0	ISATHA	em A
Projec	t AMIL	NATE	RIOLN
Coco	Io .		

				Case No.	61453-50
TANK / SUMP DESC	RIPTION	,			
Sampling Access Description	on REMOVE R	ouno /soiso	MANHOLE		
Leak Detection / Monitori	ng Present (Descr	ribe) <i>Nor_A</i>	PAPLICABLE (N		
Tank /Sump Dimensions	(LxWxH) 4 oram.	GOFEP Tot	al Volume	/. % Fi	ull 4"STAND. NO
Tank / Sump Status: Acti	ve Inac	tive	Date Insta	lled	Age
Type Of Construction				77 (80 to 10	
Content History Sum	P EAST STOL	OF BUSLO	ENG #243.		
HEALTH and SAFET	Y MONITORI	ING			
Equipment Used (Calibra	ted Y/N)	APPLICA	918		
Air Quality Readings	Pre-Sampling _	Time	Reading	Time	Reading
	During Sampling _ During Sampling _				
	During Sampling _				
	Post-Sampling _				
SAMPLING PROCED			,		
Equipment Used (Calibra		ess Steer Base	EN W/DEDECATED	STRENG + CHE	M. RESLS). GLOVES
Decontamination Procedu				_	
Detergent Wash Water Rinse		ent Rinse er Rins e	Detergent Water Rin		Other
Solvent Rinse	*****	er Atmo	water Kin	3× I	O.I. WATER
Water Rinse				,	Renge
Solvent Used					
SAMPLING	VOLUME	EH TEDED		2.1.	
SAMPLE METHOD	(ml)	FILTERED (Y/N)	PRESERV.	PHALVSES	TIME
DIAGUOI BAELER	40 mol (x3)	No	Ice HCI pH 2	TCL+30 YOL.	1330
11 11 11	1 GALLON	<u> No</u>	Ics	TC1+30 SEME.	1330
11 11 11	11	No	ICE, NOON PHOIZ		1330
· · · · · · · · · · · · · · · · · · ·			+ Z ~ ALGTATE		
<u> </u>	1.6	YES	ICE, HND ANICZ	MUTHIS/TCL	1330
LOCATION DIAGRAI	M and NOTES	(Indicate orie	entation, sampling lo	cations, dischar	ge / fill_points)
	ARSCHAL			carolis, discitar	ge / Im points)
N 97772			///////////////////////////////////////	2///////	1/1/1/2
1 1/19/mw-10	>			Mw-	13
	Ph	PRING			# ···
246		LOT	OIAQUOI mi	BLOG.	~ 3//
1///	6001 \$241	#243	/		
	£001 \$24 1	//////////////////////////////////////	4		11/1///
1///////			9)		
Signature	Total	Date	2/20/90 No.	Of Bottles	7

Tank and Sump Sampling Data Sheet

Date 2-30-90/2-22-90
Client 606/USATHAMA
Project AMIL-JATELION
Case No. 14457-50

	<u> </u>		<u> </u>	Case No.	61453-50
TANK / SUMP DESC	CRIPTION				
Sampling Access Descrip		ELER THROUGH	VENT STACK		
Leak Detection / Monitor	ring Present (Desc	ribe) <i>Tanks ma</i>	SHEASHED IN CO.	NORETE VALLE A	2 ADARY CONT.
Tank Sump Dimensions	5 (LxWxH) 12 150,74, 3	O'LONG Tota	al Volume 10,00	и. 10 <i>9 Ев</i> СН % Fi	ull <u>& 5 % EACH</u>
Tank Sump Status: Ac				alled	
Type Of Construction _				CONPARY CON	ASHMONT
Content History Compa				· · · · · · · · · · · · · · · · · · ·	
HEALTH and SAFET	TY MONITOR	ING			
Equipment Used (Calibrate	ated Y/N)	APPLICABLE			
		Time	Reading	Time	Reading
Air Quality Readings	Pre-Sampling During Sampling		 		
	During Sampling				
	During Sampling Post-Sampling	<u> </u>			
SAMPLING PROCE					
Equipment Used (Calibr		IINN RATIKAC	EDIN (DICHAM.	BAY CIRALES	ORL + POST & AMP)
Decontamination Proced		AUNT OFFICERS	ALTER (ARTORA)	CAT CEOMMEN	
Detergent Wa		vent Rinse	Detergen	t Wash	Other
Water Rinse		ter Rinse	Water R	inse 🛂	Δ
Solvent Rinse Water Rinse					RINIA BEFORG E + DI RINSC
				AFTO	· · · · · · · · · · · · · · · · · · ·
Solvent Used					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD		(Y/N)	PRESERV.	CITIER.	TIME
OBOTLOZ I"BATIFR	40 ml (13)	No	106 Ice -	TCL+30 VOL.	1600 2/20/90 7 1600 2/20/90
			###	PCB CVANIU	
				SULFTOG,	
				METPLS -	J
030TLO/ I"BATLER		No	Ice	SAME	1355 2/22/90
# ^{3/} 1/ 1/		<u> </u>	<u>Içê</u>	Same	1355 2/22/90
LOCATION DIAGRA	AM and NOTE	S (Indicate orie	ntation, sampling	locations, dischar	ge / fill points)
MANHOLE ARS	ENAL ST.			4 🗸	
**************************************	51.01 4////03	OFLOS ///		17.	
p @ my -94 11-1			1/// 81	06. #226 ENTR	Y DOORS
					i
n //// ! : U			BLOG	. # 43	
K 0 1 7	8106.#226	 //////////	1////	•	
N /////////	1///////	<u>////////</u>	1/1//		
	BLDG. # 43		declar N	Of Pottles	1 + 4 + 0
Signature	w <u> </u>	Date	2/22/90 No	o. Of Bottles <u>4</u>	7 7 7 8

Date 220-90	
Client E6+6 /USATHAMA	
Project AMTI - NOTEATOW.	~
Case No. 61453-50	

TANK / SUMP DESCRIPTION Sampling Access Description 2 - 2" HOLES DRELLED (PMENEOUSLY) THROUGH LAB FLOOR Leak Detection / Monitoring Present (Describe) None Tank Sump Dimensions (LxWxH) UNKNOWN Total Volume % Full \$\pi 50 \% Tank / Sump Status: Active Inactive Date Installed Age Type Of Construction UNKNOWN (CESTERN UNDER \$LD6. \(^3\)33c HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor America Blue (Sampling During Sampling During Sampling During Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling	, a
Sampling Access Description 2 - 2" HOLES DRELLED (PREVIOUSLY) THROUGH LAB FLOOR Leak Detection / Monitoring Present (Describe) None Tank Sump Dimensions (LxWxH) UNKNOWN Total Volume % Full * 50 % Tank / Sump Status: Active Inactive Date Installed Age Type Of Construction UNKNOWN Content History UNKNOWN (CESTERN UNDER SLUE. 313 c HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor Amiscable Air Quality Readings Pre-Sampling During Sampling	, ,
Leak Detection / Monitoring Present (Describe)	β
Tank Sump Dimensions (LxWxH) UNKNOWN Total Volume % Full \$\size 50 \sqrt{2}\$ Tank Sump Status: Active Inactive Date Installed Age Type Of Construction UNKNOWN Content History UNKNOWN (Cestern UNDER SUDE. 313 c) HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor Annecorate Air Quality Readings Pre-Sampling During Sampling During S	
Tank / Sump Status: Active Inactive Date Installed Age Type Of Construction	
Type Of Construction	
Content History	
HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor Apricoagle Time Reading Pre-Sampling During Sampling During Sampling During Sampling During Sampling During Sampling	
Equipment Used (Calibrated Y/N) Nor Applicable Time Reading Time Reading	
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling During Sampling	
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling During Sampling	
During Sampling	
During Sampling	-
Post-Sampling	_
i voi-vamping	
SAMPLING PROCEDURE	
Equipment Used (Calibrated Y/N) USED 1" DEAM. TEFLON BALLER, CHEM. NESSES. GLOVES, DEDICHME	
Decontamination Procedures Used	16.
Detergent Wash Solvent Rinse Detergent Wash Other	
Water Rinse Water Rinse Water Rinse Water Rinse Water Rinse 3 x D. L. H ₂ O RIA	use
Water Rinse	
Solvent Used	
SAMPLING	
VOLUME FILTERED ANALYSES	
SAMPLE METHOD (ml) (Y/N) PRESERV. TIME	
0910401 BASLER 40 ml (13) No Lee HClops 2 701-30 Vol. 1415 " " " 16A40N No Let 701+3086ms, 1415	
" " " " 1.6 No ICE, NADHON 312 CYAMEDE 1415	
" " " IL NO ISE NADNANDE 1415	-
" " " 11 YES ICE, HADE PARE MOTHES / TELL 1415	_
	_
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points	s)
11/1/1/1/1/ //\dagger	
$N = \frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} \right) \right)$	
4 DHELVES	
© 81.06.	PILD
313 / MARKE	O
The Hole work	FOR
Travie (a) STABU	<u>ei</u>
CESSEAN CESSEAN THE	
Signature Date 2/20/90 No. Of Bottles 7	

Date	2.3	20-90	
Client,	EG+6/4	ISATHAMA	
		· WATERTOW	N
Coco			

TANK / SUMP DESCRIPTION Sampling Access Description / Interest States Interest Sta			Case No. 61453-50	
Leak Detection / Monitoring Present (Describe) Tank/ Sump Dimensions (Lawkii) ** ** ** ** ** ** ** ** ** ** ** ** **	TANK / SUMP DESC	RIPTION		
Tank/ Sump Dimensions (LxWxH) *** *** *** *** *** *** *** *** *** *				
Tank Sump Status: Active Inactive Date Installed ? Age ? Type Of Construction Steel Lange or Very Stacks) Content History (NEOTICLE OS!?) TANK DASS SLOE OF BLOOK 37 HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor Melecage Air Quality Readings Pre-Sampling During Sampling During Sa	Leak Detection / Monitori	ng Present (Describe) None		
Type Of Construction Steel Lange on Vent Streets Content History Lange on Vent Streets HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Lorent Sampling During Sampling Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. DETERMINE TIME (SCOOL) Secretar Secr	Tank/ Sump Dimensions	(LxWxH) UHKNOWN Total Volume UNKNOWN	% Full < 25%	
HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor N				
HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling During Sampling	Type Of Construction	STEEL (BASED ON VENT STACKS)		
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling During Sampling During Sampling During Sampling Prost-Sampling During Sampling During Sampling During Sampling During Sampling During Sampling During Sampling Post-Sampling During Sampling During Samplin	Content History (NEAT	THE OEL?) THAN GAST SLOT OF BLOG. # 39	-Amazon and a second	
Air Quality Readings During Sampling During	HEALTH and SAFET	Y MONITORING		
Air Quality Readings During Sampling During	Equipment Used (Calibra	ted Y/N) Nor APPLECABLE		
During Sampling During Sampling During Sampling During Sampling Post-Sampling SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Seam, Basisti of Journal Straint, and Custom Resists. Giovets. Decontamination Procedures Used Detergent Wash Water Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SAMPLE METHOD (ml) (Y/N) PRESERV. SAMPLE METHOD (ml) (Y/N) PRESERV. SOURCE SEASE TIME OF O		Time Reading	Time Reading	
During Sampling During Sampling Post-Sampling Post-Sampling SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Orang, Sacret w/ Severand States, and Curin Resets, Georges. Decontamination Procedures Used Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SAMPLE METHOD (ml) (Y/N) PRESERV. SOLUTION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)	Air Quality Readings		J	
SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Deam, Basist N / Develand States, and Calibrated Y/N) / Deam, Basist N / Develand States, and Calibrated Y/N) / Decontamination Procedures Used Detergent Wash Water Rinse Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SAMPLE METHOD (ml) (Y/N) PRESERV. SOUND SO		During Sampling		
SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) Seam, Baciel Developed States Decontamination Procedures Used Detergent Wash Water Rinse Detergent Wash Water Rinse Detergent Wash Water Rinse Water Rinse Water Rinse Detergent Wash Water Rinse Other Water Rinse Water Rinse Water Rinse Detergent Wash Water Rinse Water Rinse Water Rinse Water Rinse Detergent Wash Water Rinse Water Rin		During Sampling		
Equipment Used (Calibrated Y/N) Seam, Sacret wo procease state, and come resets. Gloves. Decontamination Procedures Used Detergent Wash Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Detergent Wash Water Rinse De				
Decontamination Procedures Used Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Water Rinse Solvent Used			÷	
Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SOLVENT STACKS SOLVENT STACKS Detergent Wash Water Rinse Detergent Wash Water Rinse Other Other Detergent Wash Water Rinse Other			O CHIM RESEST. GLOVES,	
Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse 3. D. J. H. O. Rense Sampling Sampling Sample Method (ml) (Y/N) PRESERV. Sample Method (ml) (Y/N) PRESERV. Solvent Solvent Solvent Stacks Solvent Used Sampling Solvent Stacks Solvent Used Sampling Solvent Stacks			. 57.00	
Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SOLVENT STACKS	9		osh Other	
SAMPLING VOLUME FILTERED SAMPLE METHOD (ml) (Y/N) PRESERV. OSOSILO BELLER 40 ml (18) No Ice ICI 30 Vol ISOO " " SOOM! No Ice ICI 30 Some ISOO PROBLEM ISOO ISOO	Solvent Rinse		3. D.I. HzO RENSE	
SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. STEER TIME OSOILOI BELER 40 ml (13) No Ice IC 130 Vol 1500 """ " SOOme! No Ice IC 130 Seme POG/PEST, CYCHEVE, METHOD NOTE STREES LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) NOTE STREES NOTE STREES NOTE STREES NOTE STREES BLDG. 39 VENT STREES SAMPLE METHOD ANDLYSES TIME 1500 POG/PEST SUPER STREES TIME 1500 POG/PEST SUPER STREES SUPER STREES TOTAL SOOME POG/PEST SUPER STREES SUPER SUPER SUPER SUPER STREES SUPER SUPE	Water Rinse			
SAMPLE METHOD (ml) (Y/N) PRESERV. STHER TIME OSOSIOI BELLER 40 mm) (18) No 3ce 10130 Vol 1500 """ SOOM! NO 3ce 10130 Sems 1500 PCB/PEST, Craneve, Suitive, Metals No 3ce 10130 Vol 1500 PCB/PEST, P	Solvent Used		The state of the s	
SAMPLE METHOD (ml) (Y/N) PRESERV. TIME OSOILO! BELIER 40 mm (1.3) No Ice 1500 """ SOOme No Ice 1500 PCG/PEST, CYPRICES, SULTIDE, METHOD NO Ice 1500 PCG/PEST, CYPRICES SULTIDE NO ICE 1500 PCG/PEST, CYPRICES PCG/PEST, CYPRI	SAMPLING	VOLUME EU TEDED	4	
CSOILOI BALLER 40 mm (18) No Ice 10130 Vol 1500 """ SOOrmal No Ice 10130 Sems 1500 PCB/PEST, Cremence, Sulvide, Metals No Ice 10130 Vol 1500 PCB/PEST, Cremence, Sulvide, Metals No Ice 10130 Vol 1500 PCB/PEST, Cremence, Sulvide, Metals No States PCB/PEST, Cremence, Sulvide, Metals No States No Stat	SAMPLE METHOD		_	
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) State PEB/PEST Cranesc Sulviore Sulviore Sulviore Sulviore Sulviore Sulviore Sulviore State Sulviore State Sulviore State Sulviore State Sulviore State Sulviore State Sulviore Sulviore State Sulviore Sulv	OSOILOI BATLER			
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) BLDG. 39 VENT STACK BLDG. 39 VENT STACK	<u> </u>		,	
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) BLOC. 39 VENT STACKS BLOC. 39 VENT STACK		_		
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) **BLDG. 39** **VENT STACK** **BLDG. 39** **VENT STACK**				
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK			(F1915	
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK				
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK	LOCATION DIAGRA	M and NOTES (Indicate orientation, sampling locat	tions, discharge / fill_points)	
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK			dons, disenarge / Int points)	
VENT STACKS BLOG. 39 VENT STACK ROW VENT STACK				
BLOG. VENT STACK	N BLOG.	39	70 636	
YENT STACK		VENT STACKS BIDG.		
Skimble)			· · · · · · · · · · · · · · · · · · ·	
			ال ا	
<u> 0501101</u>	<u> </u>		<u>05 01201</u>	
Signature Date 2/20/90 No. Of Bottles 4	Signature	Date 2/20/90 No. Of	f Bottles	
Page _ / _ of _ /			Page 1 of 1	

Tank and Sump Sampling Data Sheet

Date 2-22-90
Client & 6-6 / USATHAMA
Project PATL-WATERTOWN
Case No. 61453-50

TANK / SUMP DESCRIPTION Sampling Access Description THROUGH BLDG. 226 VALUE DOORS + DOWN LADDER. MANHOLE OPEN® OFFICE AND Leak Detection / Monitoring Present (Describe) BLDG. 226 ES CONCRETE (2"DAY COME.) AROUND 2 TANKS. Tank Sump Dimensions (LxWxH) (2 x 10 CACH Total Volume 2-10,000 GAL. % Full BOTH < 5 % Tank Sump Status: Active Inactive Date Installed Age
Leak Detection / Monitoring Present (Describe) BLOD. 226 ES CONCRETE (2"DANY COMT.) AROUND 2 TANKS. Tank Sump Dimensions (LxWxH) (2 x30 CACH Total Volume 2-10,000 GRL. % Full 8074 < 5 %
Tank Sump Dimensions (LxWxH) (2 x 30 CACH Total Volume 2-10,000 GRL. % Full 8074 5 %
Tank Sump Status: Active Inactive Date Installed Age
.
Type Of Construction Value = Concress, Tanks = Steel.
Content History Valle Houses THE 2 TRAKS, SLUDGE 035160/ COLLECTED FROM VALLETIOOR
HEALTH and SAFETY MONITORING LEVEL ISAMPLER EN SCBA (30 MEN) AND FLASHING
Equipment Used (Calibrated (N) 3 people: 18 BASE OF LADDER W/ SMEN. ESCAPE PACK + HNo-PSD.
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling
SAMPLING PROCEDURE
Equipment Used (Calibrated Y/N) <u>5CBA (30 msw.)</u> FLASH LEGHT, CHEM RESZST. GLOVE, GLASS BEAKER
Decontamination Procedures Used
Detergent Wash Water Rinse Solvent Rinse Water Rinse Detergent Wash Water Rinse Other
Solvent Rinse 31 D. I. H ₂ O RIMSE
Water Rinse
Solvent Used ————————————————————————————————————
SAMPLING VOLUME FILTERED Analyse's
SAMPLE METHOD (ml) (Y/N) PRESERV. OTHER TIME
0351401 GLASS BEAKER 40 ml (+2) No ICE 751+80 Vol. 1355
(SCRAPE FLOOR) 500 ml NO ICE TO1+30 SEME, 7 1355
(SCRAPE FLOOR) 500 ml NO ICE TO1-30 SEME, 7 1355 PCB/Pist, CYANEDE,
(SCRAPE FLOOR) 500 ml NO ICE TC1+30 SEME, 7 1355
(SCRAPE FLOOR) 500 ml NO ICE TO1-30 SEME, 7 1355 PCB/Pist, CYANEDE,
(SCRAPE FLOOR) 500 ml NO ICE TO1-30 SEME, 7 1355 PCB/Pist, CYANEDE,
(SCRAPE FLOOR) 500 ml NO ICE TO1-30 SEME, 7 1355 PCB/Pist, CYANEDE,
(SCRAPE FLOOR) 500 ml NO ICE 701-30 SEME, 7 1355 PCB/PLOT, CYPNEDE, SHIFTDE
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) ARSENDE STREET
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) ### DIAGRAM WHICH Compare from 1355 135
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) ARSENDE STREET **O ENDICATES
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) ### DIAGRAM WHICH Compare from 1355 135
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) ##SENDL STREET DIAGRAM WHICH WERE COMPOSITED Composition Composition

Date	2	22-90
Client	£6+6,	LUSATHAMA
		L-WATERTOWN
		11/03

		Case No. 61453-50	
TANK / SUMP DESCI	RIPTION		
Sampling Access Description 2.0' OEEP (DRY) SUMP LOCATED IN BASEMENT OF BLOG. 36.			
	ng Present (Describe) Nor Applicable		
	(LxWxH) /'x/'x 2' Total Volume 2 custo	<i>ft.</i> % Full <u>0 %</u>	
		l Age	
~ -	CONCRETE SUMP W/ SUMP PUMP INSTALL	<i>ED</i> .	
Content History Sum.	0 BLU4. 36.	1.00	
HEALTH and SAFET	Y MONITORING		
Equipment Used (Calibrat	ted Y/N) Nor Applicable	Versi PR kalders led	
Air Quality Dandings		Time Reading	
	Pre-Sampling During Sampling		
	During Sampling		
	During Sampling		
SAMPLING PROCED			
	ted Y/N) <i>Dedicated teston beaker</i> , wooden	V SCOOP LAYIEY GLAURE	
Decontamination Procedu		. VI-DI BILLIVI GIUVES	
Detergent Wash	Solvent Rinse Detergent Was	sh Other	
Water Rinse	Water Rinse Water Rinse	3x D.I. HzO RINSE	
Solvent Rinse Water Rinse		0 x 0 121 11 20 1021110	
Solvent Used			
SAMPLING	VO. 13		
SAMPLE METHOD		HALYSES TIME TIME	
O7AQUO) SCOOP		111VIE	
<i>B H H H</i>	18 No Ich 70	1+30 SEMS, 1445	
22 29 41 -49		CB/PEST 1445	
14 19 94 19		FTAU/TC) 1445	
LOCATION DIAGRA	M and NOTES (Indicate orientation, sampling locat	ions, discharge / fill points)	
	DRY E6+G REQUESTED THAT A SEDEMENT SAM	- -	
INSTEAD.	E (STEPS TO BASEMENT)		
	15 m		
N		, , ,	
1 -	07 AQUO	1×1×2 CONCRETE SUMP	
/		N/ SUMP PUMP IN	
	BLDG. 36	PLACE.	
Signature		Rottles	
Signature	Date 2/22/40 No. Of		
7		Page / of /	

Date 2-22/23 - 90	
Client EGIG/USATHAMA	
Project AMTL-WASERTOWA	_
Casa No	_

	Case No. 61453-50
TANK / SUMP DESCRIPTION	
Sampling Access Description REMOVE STORM SEWER MANHOLE	
Leak Detection / Monitoring Present (Describe) Nor AppleCable	
Tank / Sump Dimensions (LxWxH) _ See Below Total Volume	V.L)い Flow % Full <u>578844646</u>
Tank Sump Status: Active Inactive Date Instal	lled Age
Type Of Construction BASCH AND CONCASSE	
Content History STORM SEWER SUNFACE RUN-OFF	
HEALTH and SAFETY MONITORING	
Equipment Used (Calibrated Y/N) No. Aprile Age	
Time Reading	Time Reading
Air Quality Readings Pre-Sampling During Sampling	
During Sampling	
During SamplingPost-Sampling	
SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) From surface Usent Stragnless S	***** *** ***** * * * * * * * * * * *
Decontamination Procedures Used	GLOVES
Detergent Wash Solvent Rinse Detergent	Wash Other
Water Rinse Water Rinse Water Rinse	ise 🔼
Solvent Rinse Water Rinse	3x D.I. waser Rensi
	20130
Solvent Used	
SAMPLING VOLUME FILTERED	ANNESES
SAMPLE METHOD (ml) (Y/N) PRESERV.	TIME TIME
16AQUO 5.5.DSPPER 40 mf ("3) No Ice, NC/pN=2 " " " / GALLON NO Ice	761 - 30 Voc 2143 (2/22/40)
1) 11 11 12 No 316 // ACM p W > 12	74+30 Sems 1738 CYANSUE 1738
11 " " 12 NO ZUE HADNON 19,	Surfide 1738
" I NO ICE MAD 2012	Mesnus/TC1 1738
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling lo	ocations, discharge / fill points)
24 HOUR CLMPOSSIE OF ALL SAMPLES EXCEPT YOAS.	. A @: 24" DEAM.
(100 1/1/1 VIIII) TOTAL DEPTH	NEAR BOTTOM
N /	B 12" DE AM. NEXT TO A
16A6U01 0	O:5"DIAMETER,
MW-06 @///	3' FROM SURFACE
	O = 8" DSAMETER
SOUTH EAST GATE BONNY PIPE NE	TH FLOW, 5' FROM SURFACE
GUARD HOUSE STANDENG HID NOT SAMPLED.	PRESONT BUT
Signature Date 2/23/90 No.	Of Bottles

Date			
Client	EGTE	5/456	THAMA
Proje	ct am	52 - Na	SEATON N
			2.60

				Case No. 7	11453-50
TANK / SUMP D	DESCRIPTION	2			
Sampling Access De	scription <u>Remove</u>	STORM SEW	ER MANHOLE		
	onitoring Present (Des				
Tank /Sump Dimer	nsions (LxWxH)	E BELOW Tota	al Volume	% Fu	6000 FLOW +
	s: Active X Ina			lled	-
	on BRICK AND				
	STORM SEWER				
	FETY MONITOR	RING	****		
Equipment Used (C	alibrated Y/N)	OF APPLICAB	uE		
	•	Time	Reading	Time	Reading
Air Quality Reading	gs Pre-Sampling				5
	During Sampling During Sampling				
	During Sampling				
	Post-Sampling				
SAMPLING PRO	OCEDURE				
Equipment Used (C	alibrated Y/N) <i>From</i>	SURFACE USEN	O STADULES STEE	DEPPER + CHE	em. RESIST, GIOVES,
Decontamination Pr	rocedures Used				
		lvent Rinse	Detergent		Other
Water I Solvent	111111111111111111111111111111111111111	ater Rinse	Water Rin		D.I. HZORENSE
Water 1				J	
Solvent Used				NAME	
SAMPLING					
	VOLUME	FILTERED	PRESERV.	ANALYSES ETTER	TDAE
	THOD (ml) Prace 10 ml (v3)	(Y/N)	IRESERV.	TC/+30 Voc.	TIME 2215 (2/22/90)
11 11 11	" IGALION	No	Ict	701.30 SUME.	1804 (2/23/70)
11 11 11	" 1.6	No	Ict, NACH, H=12		1804 (2/23/90)
11 11 25	<u> 1.l</u>	<u>~/o</u>	[ICE, NAON DN >9]	SHIFTUE	1804 (2/23/20)
<i>1)</i> 11 11	11 1.6	No	Ice, HNO, pH 12	METARS / TCI	1804 (2/23/90)
ITAGUO SAN	nt same	SAMLE	Same	Same	1824(2/23/90)
LOCATION DIA	GRAM and NOTE	S (Indicate orie	ntation, sampling le	cations, dischar	ge / fill points)
IZAQUOI X		· Letter	lu _B	ITAQUE) <u>2</u>
	TOSO BEEN	3//3/		6000 FLOW, 2	YHOUR COMPOSETE)
SAMPLE, NO FLOW)	of the		- VIII	@	8 A = 24" DEAM.
ikî	GE 20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TI P	117		5.0' FROM SURFACE
	S X T BE			(**	B = 24" UZAM
	N BET O		IVAQUOS	\' - /	8.0' FROM
4:10	1 2				SURVACE
8 = 6" DIAM. ZND FLOW C = 12" DIAM.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			<i></i>	FLOW COLLECTED IROM (1).
Signature	f. Tole	Date	2/23/90 No.	Of Bottles _ 7	
d				Pa	ge / of /

Date 2-2	2/23-90
Client <i>EG 10</i>	LUSATHAMA
	1- NATERTOWN
Case No.	61453-50

		Case 110. 6/453-50
TANK / SUMP DES	CRIPTION	
Sampling Access Descrip	ption REMOVE STORM SEWER MANHE	012
	oring Present (Describe) Nor Applicable	
	ns (LxWxH) See Below Total Volume	£184) #
Tank / Sump Status: Ac	ctive X Inactive Date Insta	lled Age
Type Of Construction _	BRICK AND CONCRETE	
Content History 57	DAM SEWER (POSSIBLY SCPTEC/SANJIMAY	scuer)
HEALTH and SAFE		
	rated Y/N) Nor Applicable	
Equipment Osca (Canon	Time Reading	Time Reading
Air Quality Readings	Pre-Sampling	
	During Sampling During Sampling	
	During Sampling	
	Post-Sampling	
SAMPLING PROCE	EDURE	
Equipment Used (Caliba	rated Y/N) <u>Faom sumpace, us and stachless stell</u>	DEPPER CHEM. RESEST. GLOVES
Decontamination Proceed	dures Used	·
Detergent W		
Water Rinse Solvent Rinse		3x D.I. H2O RENSE
Water Rinse		•
Solvent Used		
SAMPLING		
	VOLUME FILTERED	Anglyses TIME
SAMPLE METHOI 1840403 5.5.Deppe		TIME 101130 Voc 2230 (2/22/90)
11 11 11 11		TC1-30 Sems 1836 (2/23/90)
11 1/ 11 H		CYANEDO 1836 (2/23/10)
, , , ,		Suifful 1836 (2/25/90)
11 11 11 11	12 No Ice, 040, p8-2	MOTALS /KI 1836 (2/23/40)
		
	AM and NOTES (Indicate orientation, sampling le	
1// WILL REI	ACTOR 18AQL	103 Q= 12" DEAM. APPROX. 9.5', FROM
N 8106, 1//	• = OTHER MANHOUSS	C & B = 6" DEAMETER
#97	1///	A PPROX. 6.0 F.S.
	T/18AQUO3 / M	4.0' (F.S.)
	\[\frac{1}{1}\rightarrow\rightarr	9 4.0" (F.S.) 9 = 30" DEAM CTEL, APPRIX, 10.0" F.S.
CSTEPS	477	(= 12 DEAMETER, APPROX.
HA BROWN BULL	B PEPES WETH FLOW	3.0' 8.5.
THE WALLEY	WHICH WERE SAMPLE	ED
Signature	Date No.	. Of Bottles

Date 2-22/23-90
Client EG+G /USATHAMA
Project AMTL WATERTOWN
Case No. curcz 50

				Case No.	61453 50
TANK / SUMP DE	SCRIPTION				
Sampling Access Descr	ription <i>Re.</i>	MOVE STORM	SEWER MANN	roce i	18 AQUO 2 / 18 AQUO 4
Leak Detection / Moni	itoring Present (De	scribe)	APPLICABLE		7
Tank (Sump Dimension	ons (LxWxH) Sec	BELOW Tot	al Volume	% F	ull FLOW FLOW
Tank Sump Status:	Active X In	active	Date Insta	lled	Age '
Type Of Construction					
Content History	TORM SEWER.				
HEALTH and SAF		,			
Equipment Used (Cali			72 E		
aquipment oben (oun		Time	Reading	Time	Reading
Air Quality Readings	Pre-Sampling				3
	During Sampling During Sampling				
	During Sampling				
	Post-Sampling				
SAMPLING PROC					
Equipment Used (Cali	brated Y/N) <i>Exom</i>	SURFACE, USEN	G STAINLESS STEEL	APPFIL, CHEM	RESIST. GLOVES
Decontamination Proc	edures Used			_	
Detergent '		olvent Rinse Vater Rinse	Detergent Water Rir		Other
Water Rin Solvent Rin		ater Kinse	water Kii		T. HID RINSE
Water Rin	se				
Solvent Used					
SAMPLING	_				
_	VOLUME OD (ml)	FILTERED (Y/N)	PRESERV.	AMPLYSES OTHER	TIME
SAMPLE METHO <u>1846UO2</u> 5.5.056		No	Tre, Helphia	10/+30 You	2250 (2/22/20)
11 11 11	" /GAUON	No	Zee,	TC1+30 SEMC	1435 (1/21/90)
11 41 a	" 12	No	ICE NOOHPHYIA	CYANEDE	<u>1435 (2/23/90)</u> 1435 (2/23/40)
			ILE NODHAN-9 ZNACTATO	SULFIPE	1435 (2/23/70)
11 11 11	" 12	No	ILB, HND3 pH-2	Merais/rei	1435 (2/23/40)
IBAOUDY SAME	SAME	Same	SAME	Same	VOA: 2307 (2/22/10)
LOCATION DIAG	RAM and NOTI	ES (Indicate orie	entation, sampling k	ocations, dischar	ge / fill points)
8106. # 3	· 1		1 1846	1402	18AQU04
	(1840U02) D.O = MANHOLES AN	===	ETRENCH	
134 1	1/1/201	GRATES			CONCRETE
		= SAMPLE LOC	ATTONS @ (9)	40 ®	THOUGH /
18AOUOY TOU SOMPLED A					
MW-02 TRENCH, BOTH ARE					
18" DEAM. APPROX 4.0 DEAM FLOW B" I ROM SURFACE DEAMETER APPROX.					
C+ & No FLOW, BOTH & DEAM. 2.5' DEEP.					
Signature	1. Tort		, ,	Of Bottles _	7.7=14

Date 2-	22/23-40
Client 26.	IC LUSATHAMA
	MTI WATERTOWN
	61453-50

				Case No. ,	61453-50
TANK / SUMP DESC	CRIPTION				
Sampling Access Description Remove STORM SEWER GRATE					
Leak Detection / Monitor	ing Present (Desc	ribe) <i>Nor A.</i>	PPLICABLE		
Tank /Sump Dimensions	(LxWxH) SEE	BELOW Tota	l Volume		
Tank Sump Status: Ac	tive <u>X</u> Inac	ctive	Date Instal		Age
Type Of Construction _					
Content History <u>570</u>	RM SEWER S	UNFACE RU	N-OFF		
HEALTH and SAFET	Y MONITOR	ING			
Equipment Used (Calibra	ated Y/N)	APPLECAS	82 E		
		Time	Reading	Time	Reading
Air Quality Readings	Pre-Sampling During Sampling				
	During Sampling				
	During Sampling Post-Sampling				
CAMPI MIC PROCE					
SAMPLING PROCE					
Equipment Used (Calibra		SURFACE, USIN	IC SIREMLESS S	TOEL DIPPER	CLOVES
Decontamination Proced		vent Rinse		nv T	7 01
Detergent Was Water Rinse		ter Rinse	Detergent ' Water Rin	K	Other
Solvent Rinse				3x D	.I. Water Renst
Water Rinse					
Solvent Used					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD	(ml)	(Y/N)	PRESERV.	CINER.	TIME
IBAQUOI S.S. DEPPER		No	Ict, HUpwi2	701+30 Vac	2320 (2/22/10)
11 ii	10ALION	No	<u>Ice</u> I <u>ce, naond</u> 112	TUL 30 SEMS	1902 (2/23/90) 1902 (2/23/90)
11 11 11 11	1.0	No	ICB, NACHEN: 9	Suifine	1902(2/23/90)
)/ // // // //	1.6	No	IN ACETATE Ict HAR pre2	Meray () TE I	1902(2/23/40)
					<u> </u>
	-				
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)					
	A + B = ⋈0	FLOW,)		
		OTH 2.5 DEEP	/	TRE	NCH
BLDG.	39 A= 30"DIA	m. , 8 = 18" DEAM.			-
,s, L		1//	<u>a</u> (0)	I Q	<u>D</u>
K- X IBAQU	101	/_/	- ///	R	
MW-01 THAWAY					
V. BEACH	V STREET		'/////	/////	///
Signature Date 2/23/90 No. Of Bottles 7					

Date: February 9, 1990

To: C. Washburn

From: R. Lambe 15F/214 Ext: 5498

IXI. 3498

Subject: AMTL Watertown Samples

I have been informed by my field crew that zinc acetate was added to the water samples for MW-01, MW-02, and MW-10 (collected on February 8) to be analyzed for metals by mistake. Please destroy these samples (metals fraction only). I am having new samples collected for metals today, February 9, for MW-01, MW-02, and MW-10. If you have any further questions, please call me at Ext. 5498.

Date: March 2, 1990

To: C. Washburn cc: S. Spellenberg

From: K. Thrun Loc: 15F/202 2311 Ext:

Subject: EG&G Idaho, AMTL Watertown

As discussed with you and Steve Spellenberg, metals analysis was inadvertently omitted from the chain-of-custody sheets for the following samples:

> 030IL01 03SLG01 03OIL02

050IL01 (if labeled 050IL02, this sample should correctly be

labeled 05OIL01)

Please add.

Date:

February 16, 1990

To:

C. Washburn

From:

R. Lambe

Loc:

15F/214

Ext:

5498

Subject: AMTL Watertown Samples

I have been informed by my field crew that equipment blanks were collected today for the soil sampling activity, four days after the last complete day of soil sampling. The field crew duplicated soil sampling procedures at sample locations 01sol01 and 06sub01 and conducted normal decontamination procedures of all sampling equipment after each sample. Equipment blanks were collected following decontamination procedures and labelled 01sol01BL and 06sub01BL. No soil samples were actually collected during this procedure. If you have any further questions, please call me at extension 5498.

Date:

April 25, 1990

To:

Files

From:

Robert Lambe, AMTL Project Manager

Subject: Chain-of-Custody Forms for AMTL Project

It has come to my attention that three chain-of-custody forms completed by Scot Foster of Arthur D. Little were signed in the "Sampler(s) (Signature)" space and not in the "Relinquished by: (Signature)" space as required. These forms are:

2/9/90

02S0L01, 06AQU01, 17S0L01, 17SUB01, 17SUB02

(two pages)

2/12/90

03S0L01, 06S0L01, 09S0L01, 09S0L02, 13S0L01,

15S0L01, 17S0l02, 17SUB03

(two pages)

2/16/90

OSOLO1TB, OSOLO1BL, O6SUB01BL

(one page)

Each of the sample containers (coolers) holding these samples was personally delivered by Scot Foster on the evening of the collection day to the limited access, secure facilities of Arthur D. Little at Acorn Park in Cambridge. The samples were logged in by the laboratory as follows:

Samples Taken/Delivered

Samples Received by Laboratory

2/9/90

2/12/90

2/12/90

2/13/90

2/16/90

2/16/90

I, Scott Foster, do attest that the above statement is an accurate description of the situation described.

Witnessed Robert N. Lambe,

Project Manager

NOTARY PUBLIC

COMMONWEALTH OF MASSACHUSETTS

BUNTY OF MIDDLESEX

Arthur D. Little

VIRCENT CONTENTS ASSERTY Region I Was a Management Division

CHAIN OF CUSTODY RECORD

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ENVIRONME NL PROTECTION AGENCY

Region I Wasse Management Division

CHAIN OF CUSTODY RECORD

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ENVIRONME L PROTECTION AGENCY
Region I Waste Management Division

CHAIN OF CUSTODY RECORD

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Cooler Numbe. 1 of 3

Arthur D. Ile, Inc.

CHAIN OF CUS, JDY RECORD

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Accompanies Shipment; Yellow Copy to Case Manager; Fink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste

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Arthur D. Ite, Inc.

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager, Fink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622

(617) 864-5770

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur Tittle, Inc.

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CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; PinklCopy for Field Files

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*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste SW - Solid Waste

Arthur ittle, Inc.

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Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for Field Files

(617) 864-5770
 Arthur D. Little, Inc.
 25 Acorn Park, Cambridge, MA 02140

 Telex 921436
 Tel-Fax (617) 661-1622

SW - Solid Waste *Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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Arthur , ittle, Inc.

CHAIN OF CUS FODY RECORD

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anager; Pink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur Tttle, Inc.

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CHAIN OF CUSTODY RECORD

Page _____ of ____

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur f ttle, Inc.

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CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipment: Yellow Copy to Case Manage? Fink Copy for Field Files

25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

Arthur D. Little, Inc.

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Cooler Number

Arthur C Te, Inc.

CHAIN OF CUS rody RECORD

Page / of /

CONDITION SAMPLE RECEIPT UPON :0767 0768,0769 472 The ": 0740,0761, 076 2. ·. 0765 ,0220 1.0764 10766 :0772 1210: :0773 Carrier: 7-Shipped to: 7 Analyses ¹² The WOLH ATTER Let Noch 11312 Try Autori Jee Hely. 1.2 Ice 1110, 11422 Ice , HUB . . Hes **PRESERVATION** 166 + 1101 +1142 Received for Laboratory by: (Signature) Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink, Copy for Field Files Received by: (Signature) Received by: (Signature) AMIL- 1JAKENTOWN, MM. 3/13/2c | 1330 | Cum STATION 111 OB 10-CM 2/12/90 1835 Date/Time = * QE < B ೧೦∑ಥ PROJECT NAME 2-12-92 7:20 2-13-90 6:02 TIME --= = = = DATE Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) = = : = -SAMPLERS: (Signatyre) 2 | 61453 PROJ. NO. SAMPLE/ STATION NUMBER 80- MW --Ξ -= m~ . o.4

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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LW - Liquid Waste SW - Solid Waste

Arthur Tittle, Inc.

Cooler Number: __

CHAIN OF CUSTODY RECORD

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W • Water S • Soil LW • Liquid Waste SW • Solid Waste

ttle, Inc. Arthur

Cooler Number.

CHAIN OF CUSTODY RECORD

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25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622 Arthur D. Little, Inc.

*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste

Cooler Numb.

Arthur F ittle, Inc.

CHAIN OF CUS FODY RECORD

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Cooler Numb. 2 of 4

Arthur ' ittle, Inc.

CHAIN OF CUSTODY RECORD

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ibution: Original Accompanies Shipment: Yellow Copy to Case Manager; Pink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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CHAIN OF CUSTODY RECORD

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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CHAIN OF CUSTODY RECORD

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770
 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W · Water S · Soil LW · Liquid Waste

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.ittle, Inc. Arthur

CHAIN OF CUSTODY RECORD

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(617) 864-5770 **Arthur D. Little, Inc.** 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

ENVIRONME 1 PROTECTION AGENCY

Region I Wase Management Division

CHAIN OF CUSTODY RECORD

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ENVIRONME AL PROTECTION AGENCY

Region I Ware Management Division

CHAIN OF CUSTODY RECORD

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ENVIRONME 1 PROTECTION AGENCY Region I Www.e Management Division

CHAIN OF CUSTODY RECORD

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Arthur / ttle, Inc.

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Cooler Number:

CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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ENVIRONMEN® PROTECTION AGENCY
Region I Wass Management Division

CHAIN OF CUSTODY RECORD

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Arthur f ...tle, Inc.

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CHAIN OF CUSTODY RECORD

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

NVIRONMENT PROTECTION AGENCY Region I Wass, Aanagement Division ENVIRONMENT

CHAIN OF CUSTODY RECORD

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Arthur D 'tle, Inc.
CHAIN OF CUSIODY RECORD Jo |

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Telex 921436 Tel-Fax (617) 661-1622

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Arthur D

Cooler Number.

CHAIN OF CUSTODY RECORD

tle, Inc.

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CONDITION SAMPLE UPON RECEIPT AD1 TACK : 0887 0888 0889 ADL TAC# :0899, 0900,0901 1 VOA OIAGUOI is missing Remarks ADL TAG#: 0866, 0867 7060: 6980 : 0870 : 0892 0880 : 0872 1680 : 1680: Date / Time X Shipped to: *731 mg (\$2.73) $^{\lambda}$ $\mathbf{x}^{\dot{\zeta}}$ \times 2 Ice, do OH, NY 12 Extresions Ice, No DHOHY Ice, HHO, pHez Seb, HC10H+2 **PRESERVATION** Received by: (Signature) 2/21/50 | 925 | Will : Sill Ice Ice 106 Ice Lee Leit EAST SEDLE 6. 550 € BLDG. 39 SELDER CLEANOUS AMIL - WARREN MA. STATION LOCATION GAST TANK 2/20/90 1550 Date / Time Sump 2010 : + QE < B *00**≥**□ PROJECT NAME 1330 TIME 1530 1530 = = -= Ξ = : 2/20A0 2/20/2 DATE 2/20A0 Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) = = t = = SAMPLERS: (Signature) = 0521602 PROJ. NO. = = SAMPLE/ STATION NUMBER 01 AQU 01 6305102 61453 =

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(617) 864-5770

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LW - Liquid Waste

Cooler Number 2 of 2

Arthur [ttle, Inc.

CHAIN OF CUSTODY RECORD

Page 1 of

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for	companies 5	Shipment;	Yellow	Copy	to Case Manager; Pink	Copy for Field Files			

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

arrix LW - Liquid Waste SW - Solid Waste Arthur D tle, Inc.

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Cooler Number.

CHAIN OF CUSTODY RECORD

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CONDITION SAMPLE RECEIPT UPON 035LGOI butter says VOA'S, not semi votts 244 to 1187760 SED 56 MG 0918 SAMPLES. 14 L containers £160 9160: ADL THE # : 0910 0918 ADL TAG# : 0913, 0914 0921 6/60 : : 0920 5/60: ADL TAG # Andrew 12/ 3 Carrier: 2/22/50 11640 ,X $_{7}^{\times}$ /X Shipped to: 7 X 7× × λ /× × × 70 **PRESERVATION** Received for Laboratory by: (Signature) Received by: (Signature) Received by: (Signature) Ice Ice Ice WATERTOWN, MA FLOOR, BLDG 226 ICE Ice Sume BLOG, 36 Tet STATION 225 TACK Date/Time 16402-22-90 1530 Date/Time Date / Time BLOG = • ©Œ < œ 71111 PROJECT NAME 2-22-90 1335 2-22-90 1445 2-22-90 1445 2-22-90 1445 OTHQUOI 2-22.50 1445 2-22-90 1355 TIME 2-22-90 1335 2-22-90 1355 DATE Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature, SAMPLERS: (Signature 0356601 074QU01 0305101 030E101 (ONOVEO PROJ. NO. 61453 SAMPLE/ STATION NUMBER 1997589 10 map ±0

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SW - Solid Waste LW - Liquid Waste S - Soil